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Skill is reflected
in the quality of
Scaife cylinders
for LP gas
SCAIFE COMPANY
Founded 1802
GENERAL OFFICES AND WORKS: OAKMONT (Pgh. District), PA.
Representatives in Principal Cities
FEBRUARY, 1915

BUTANE-PROPANE

RECOGNIZED AUTHORITY OF THE
REFINED PETROLEUM GAS INDUSTRY

News

Technology



Skill is reflected
in the quality of

Scaife cylinders
for LP gas

SCAIFE COMPANY

Founded 1802

GENERAL OFFICES AND WORKS: OAKMONT (Pgh. District), PA.
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FEBRUARY, 1915



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DESOTA, KANSAS

EMCO-NORDSTROM

through a central distribution system, North American Utility and Construction Corporation serves 852 defense housing units at DeSota, Kansas, with liquid petroleum gas. This is only one of many major installations made by this company serving approximately 10,000 families over the country. The combined total gas consumption of the twenty plants is 4,000,000 cubic feet of 2,800 Btu gas. The DeSota project has provision for storing 18,000 gallons of LPG. The tank pressure is cut by an EMCO Field Regulator to 15 lbs., then master-measured by a No. 1 EMCO Meter. The distribution system

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BUTANE-PROPANE

News

Reg. U. S. Pat. Off.



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LETTERS

• Have you service or operating problems? Submit them to us and our technical department will endeavor to help you.—Ed.

Gentlemen:

We have been using natural gas for unloading cars of propane this fall and would like to know if natural gas is absorbed by propane and to what extent?

Our natural gas here runs approximately 85% methane and 15% ethane.

F. H.

Ontario

Propane will absorb natural gas but the amount of change in vapor pressure that would be experienced from the contact of the gas on the surface of the liquid while unloading a car will be small and not enough to worry about.

Most commercial propane contains some ethane and methane but in small percentages.—Ed.

Gentlemen:

Can you supply us with a chart showing the lowest temperature that various gas mixtures will vaporize at various pressures.

G. H.

Kansas

We publish a textbook entitled "Handbook Butane-Propane Gases" in which is exhaustively treated the subject of vaporization of gas mixtures at various temperatures.—Ed.

Gentlemen:

In working with one of our good customers here in Montreal they have asked us to endeavor to obtain detail information regarding a source of supply and also specifications and prices, if possible, on cookers to operate from propane gas as used in

baggage cars and on dining cars for railways.

We therefore contacted our principals, The Bastian-Blessing Co., and they referred us to you and if you can forward us any information covering this subject we would appreciate same as this is a very live subject at the moment.

G. W.

Quebec

Inquiry results in learning that the Tappan Stove Co., Mansfield, Ohio, makes this type of equipment and I am sure that a letter of inquiry to that firm will bring you the desired information.—Ed.

Gentlemen:

Will you please advise us if it is necessary or is it to any advantage to use a 3½ or 4 oz. pressure regulator at the base of the furnace on LP-Gas consuming 50,000 to 200,000 Btu's?

This is for underground or over-ground installations.

S. M.

South Dakota

A secondary regulator ahead of an appliance is only necessary if the appliance burner is designed to operate at a lower pressure than the system pressure.

Most large heaters come equipped with regulators ahead of the burners, set at the proper pressure to insure good operation, as the operating pressures in various systems are not always the same.—Ed.

Gentlemen:

We are making 550 Btu. butane-air through compressors to the city mains at a maximum pressure of 14 lbs. psi. Ordinarily in this dry climate we have very little trouble, but after each rainy spell there is moisture in the mains

which, after it has dried up, causes rust. During times of peak demand this blows up into the screen on the service regulator and gradually cuts down the flow of gas through the meter until the customer calls to report that his gas pressure is low.

Do you know of any equipment on the market that could be placed over the air intake at the plant to dehydrate the air before it is taken into the system?

V. E.

Texas

There is an automatic, calcium chloride type of air dehydrator made by the "Carrier Corp." (which has offices in all of the principal cities of the country) wherein the dehydrating medium is reactivated by continuously heating with a gas burner.

Quite possibly this will be the solution to your problem. I would be interested to know later whether or not it does meet your needs.—Ed.

Gentlemen:

We are looking for a postwar connection for bottled gas. Many of the companies in this field are already represented here.

We would greatly appreciate your forwarding us a list of all companies producing this type of product so we can select one not already here.

H. S.

Indiana

There are many producers of liquefied petroleum gases in the United States. These are listed in an annual release of the Bureau of Mines, Washington, D.C., and may be had without cost.—Ed.

Gentlemen:

May we ask you to kindly send us a list of central distribution LP-Gas systems in this country, or if you do not have such a list, advise us as to where it could be obtained. Do you know of any such companies for sale?

We would also like to know of any

manufactured gas systems whose owners would like to have them converted to LP-Gas systems.

V. S.

New York

We are compiling a directory of bulk plants in the U. S. which will be ready for distribution soon. From it you will be able to get the central plant information you seek.

The only other source where this information can be obtained, to the best of our knowledge, is the American Gas Association in New York City.

Possibly some of our readers will know of central plants which can be purchased at this time.

Should such information become available we will forward it to you.—Ed.

Gentlemen:

I have converted my car, a 1941 Buick, over to butane with a unit but it is not up to my expectation as I do not get good service out of it.

I don't know why it does not have the snap or the pull on a hill. Can you tell me why?

J. P. H.

California

The conversion of an automotive unit to operate on butane takes considerably more than the installation of a gas mixer and regulator. There are many reasons why your car may not perform as you desire, but there is no reason why it should not perform better on butane than on gasoline if the conversion operation was properly made.

We suggest that you have the car checked by a competent shop that is experienced in making butane conversions.

Among reasons which might account for lack of "snap" and pulling power of your car at this time are: You didn't change the compression ratio; you didn't change the manifold ratio; you didn't change the timing. There might be other reasons. Sometimes it is necessary to use higher altitude pistons than those in the original motor.

In other words, there are a good many changes needed to make a mechanically efficient conversion.—Ed.

● BUTANE-PROPANE News welcomes letters from our readers, but it must be understood that this magazine does not necessarily concur in opinions expressed.—Editor.

COMMENT

PROSPECTS for the use of butane in chemical manufacturing processes are utterly beyond the comprehension of the layman, both as regards variety and volume of products. A great, new future is opening up. The PAW survey, published in this issue, reveals some amazing facts.

Today's recovery of propane at refineries and natural gasoline plants is only one-tenth of what it could be from current petroleum production, says a big producer.

When more high pressure vessels are made there will be plenty of propane to fill them.

Poultry brooding. Poultry products exceed in value the normal wheat crop. Chickens rank third—next to hogs and cattle—as a source of food.

Other fuels are getting most of the brooding load. Yet butane and propane will do a better job for far less money.

Chickens are raised in every community throughout the country. How many such accounts are on your books?

It's Mr. Turner, again, who wants to arouse you from your lethargy. His series on poultry brooding starts this month in **BUTANE-PROPANE News**. If you want to pick up a load-builder, follow his articles.

"1944 may well go down in the history of the Liquefied Petroleum Gas Association as that year in which members got the most for their

money, learned more about their own and their fellow members' problems, and learned, too, to work and act together for the benefit of all.

"1944, also, will be remembered as the year in which the industry's much needed publicity campaign finally got under way."—*From a report of the activities of the LPGA.*

According to G. G. Oberfell and Ross W. Thomas, Phillips Petroleum Co. mentors, the marketed production of liquefied gas in 1944 totaled 785,000,000 gals., a jump upward from 1943 of 16.2%.

Of the homes in the U. S. without city gas, only about 10% have installed LP-Gas, it is stated. That leaves upward of 20,000,000 prospects—enough for even an energetic industry. And domestic sales may prove to be the smallest end of future business!

Safety is the major industry theme today. Not that the record isn't good. On the contrary, it is excellent. But when accidents have occurred, they have been spectacular and attracted news comment.

Preach, teach, fight for Safety!

Neglected markets! Restaurants in every town, along every U. S. highway. Most of them using inferior fuels because our industry men have not tried to sell them liquefied gas!

Watch for the February thaw!

By "Ed."

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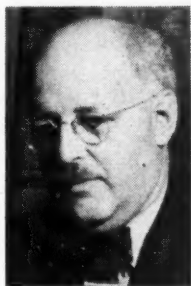
World's Biggest Selling Popular Priced Ranges -

MAINLY BEYOND THE MAINS

By ELLIOTT TAYLOR, Washington Editor

Disappointing Document

The final report of the industry committee, that has been engaged in making a special survey of liquefied petroleum gas since last April, may prove to be a very valuable piece of reference work to the Petroleum Administration for War, but the meager statistics released to the industry by PAW have a net worth of perilously close to zero as far as distributors and dealers are concerned.



ELLIOTT TAYLOR

When the job was undertaken in the spring of 1944 it was understood that the first phase, consisting of three months' actual figures and nine months' estimated, would be ready by June. It now turns out that they weren't ready until nearly the end of December, and yet the actual figures are still only for the months of January, February and March, with all of the rest of 1944 estimated, along with the forecast for the first six months of 1945.

Paul K. Thompson, chief of PAW's liquefied gas section, says in his January release, summing up the survey, that "the resulting information has been of invaluable help in planning for the coming (present) winter." If this is the case, then the work of the committee has not been in vain; but that fact does not in any way assuage the disappointment that operators in the fuel gas end of the business must feel when they read through the lengthy report that Mr. Thompson has released, only to find that all the discussion centers around the uses of butane, propane and butylenes in chemical, refinery and synthetic rubber operations.

Nor can the operators be entirely satisfied with his explanation that "ever changing problems of transportation, and storage, added to the many other variables . . . dictate that the release of information relating to the total production and use of (liquefied) gas as fuel, would tend to distort the picture and result in false conclusions rather than to provide a basis for industry to solve its present problems."

This approach to industry education has always baffled us—the bland assumption and often

the bald statement by some leaders that too much information about their own business would be detrimental to the operators in butane and propane ranks.

It seems to us elementary horse sense that if an industry survey is to be made, and the results of that survey used as the basis for admonitions to the industry to tighten its belt and prepare for even greater sacrifices in the interests of victory, some inkling of the figures on which that assumption is based should be served up as proof of the sincerity of the prophecies.

The excuse that such figures cannot be released for reasons of military security doesn't hold water either. If the Germans or the Japanese are interested in any phase of liquefied petroleum gas end usage, their natural curiosity would be how much of it is going into aviation gasoline, or synthetic rubber, and not how much is being used for house-heating in the state of Texas.

We are now advised that the special committee will continue its study for an unspecified period during 1945—presumably until we see whether we are going to dispose of the Germans before next winter. And also the study is to be expanded to include District V, thus making survey nationwide in scope. We sincerely trust that the next report that is turned up will be timely enough to be of value to all who will have a vital inter-

est in knowing what they may anticipate for the winter of 1945-46, and we strongly urge the liquefied gas section of PAW to take the trade into its confidence and let it know the true state of affairs as revealed by the actual figures which may be established.

In the 15 years that we have been interesting ourselves in the aspirations, the ambitions and the capabilities of the butane and propane operators, we have come to the conclusion that about 99% of them are both old enough and enlightened enough to be told the facts of life, and even the youngest of them know that liquefied gases are not brought by the stork. If those in high places, which includes not only the PAW but the refiners and the so-called big-shots in industry affairs, want to engender the spirit or real adult cooperation among the industry's rank and file, we submit that their first move should be to bid for that cooperation in adult terms. And that means, first of all, spreading the unadorned and unadulterated facts.

If education and general enlightenment are improper tools with which to work for industry advancement, then all education of any except the chosen few must be a dangerous and radical experiment, a falsehood which, as we understand it, Americans are now fighting to lay low.

Association Membership

The question of where the Liquefied Petroleum Gas Association goes from here is again bobbing up in our correspondence, and not from the small but valued group of chronic dissenters who are wont to point out periodically what is wrong with practically everything in the business. Those who have labored long and diligently in the ranks are now being heard from.

One operator, whose judgment we hold in great esteem, and who has always been a tub-thumper for industry advancement, lays it on the line in easy-to-understand terms:

"My chief barrage against the LPGA is that it is NOT representative. Right here in my area there are several dealers who sell more than 500,000 pounds of propane a year . . . yet they have no representation or voice in the affairs of the association. Out of approximately 400 dealers in one section there are not over 10 who are represented in any way by the association. It is well enough to say that they are represented by their suppliers, but they are represented by these suppliers in the way that the suppliers wish them to be represented. Make the LPGA truly representative of the industry and you will have all the support necessary for any promotion program . . . Another way in which the association could be of some real help, would be to assist the various operators in meeting actual problems . . . Right now it should have some traveling representatives to call on them, regardless of whether they are association members or not!"

We are not prepared to advocate a staff of association-sponsored trouble shooters who could cover the entire nation in the interests of helping dealers with their war time problems. But between such an ambitious program and the present one of

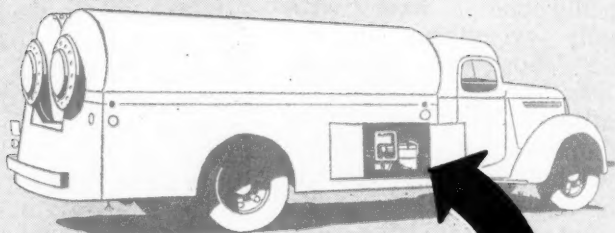
complete and utter silence to anyone except the little handful of association members, there would appear to be some common meeting ground.

The executive board of the organization has carefully dodged the issue of putting some promotional talent behind the membership aspirations of the LPGA. But the 1944 board will wind up its affairs within a few weeks, and while it is too late to urge any further consideration of an expansion program on its present members, the future of the association and its prestige as a national trade organization demand that the 1945 board place the consideration of this matter high on its agenda.

Without in any sense discounting or discrediting the good that the association has accomplished, it has always seemed to us evidence of a poorly developed sense of promotion that the organization should be able to number less than 300 members out of an industry that has many thousand operators.

With so many prospects to work on, it is not unreasonable to assume that the right kind of a man, backed by the right kind of a program, could not only materially increase the membership, but that he could do it at a net profit to the association through the new dues. Certainly those in favor of a membership campaign are entitled to consideration, out of which some plan might develop.

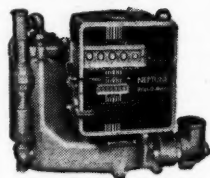
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N-3-45

Butane and Propane: Critical War Materials

By PAUL K. THOMPSON*

Chief, Liquefied Petroleum Gas Section, Natural Gas and Natural Gasoline Division,
Petroleum Administration for War, Washington, D. C.

CONTINUED use of liquefied petroleum gas as a fuel and a source of energy, together with its more recent application as a raw material in the production of aviation fuel, synthetic rubber and chemicals, has placed this product foremost in the class of critical materials.



P. K. THOMPSON

Possibly the use of no other petroleum product has developed so rapidly as the separate fractions and mixtures of propane and the butanes. The greatly accelerated war use of LP-Gas was definitely confirmed during the winter months of 1943-44 when transportation difficulties, together with localized shortages, brought about by necessary diversion of products as war materials, precipitated the worst winter in the history of LP-Gas. Early in the spring of 1944, it appeared that a similar condition would be encountered during the winter of 1944-45.

* Abstracted by BUTANE-PROPANE NEWS.

PAW Special Survey Liquefied Petroleum Gas Joint Sub-Committee

Natural Gas and Natural Gasoline
Division

W. A. Naumer, chairman, District I

G. R. Benz, chairman, District II

Louis Abramson, chairman,
District III

Dr. R. W. Leslie, chairman,
District IV

E. M. Petersen, District II
secretary

To make available all possible information relating to the supply and demand of LP-Gas, the Petroleum Administration for War requested industry representatives to determine as nearly as possible these conditions in PAW Districts I, II, III and IV for 1943, 1944 and the first six months of 1945. Similar information was already available for District V, that area embracing California, Arizona, Nevada, Oregon and Washington.

James E. Pew, Director of the Natural Gas and Natural Gasoline Division, Petroleum Administration for War, called a joint meeting of the LP-Gas Subcommittees of PAW



W. A. NAUMER



G. R. BENZ

Districts I, II, III, IV, which resulted in the organization of a Special LP-Gas Survey Joint Subcommittee.

This committee was requested by the Petroleum Administration for War to ascertain as nearly as possible the relation between the supply and demand of liquefied petroleum gases for 1943, 1944 and the first six months of 1945 in the United States, excluding the West Coast (District V).

Information as supplied by 110 companies representing 201 different plants was summarized and reported graphically by the committee. In addition, comments and recommendations are contained in the Committee's report to PAW.

The LP-Gas survey covered only the production and disposition of products. Naturally, related problems such as transportation, manpower and lack of equipment contribute to the success or failure of wartime distribution even though the required products are available in the field or refinery.

It was decided to limit this study to available information upon dis-

tribution. Such a decision was correct because the Committee had to exert all its energy to complete this work even at a late date.

In analyzing the relationship of supply and disposition of LP-Gas, widely different local conditions become apparent. Although such conditions contribute to the over-all picture, any single condition is not necessarily representative of the entire situation as reflected by such a survey. Too, ever-changing problems of transportation and storage, added to the many other variables, together make the present LP-Gas fuel situation a problem of most difficult proportions. These variables dictate that the release of information relating to the total production and use of LP-Gas as fuel, would tend to distort the picture and result in false conclusions rather than provide a basis for industry to solve its present problems.

Fuel Uses Covered Limitedly

So, use of LP-Gas as fuel is only commented on herein while its use as a chemical raw material, for refinery operations, and for synthetic rubber components is discussed graphically with actual and estimated yearly figures presented.

The growing trend of LP-Gas as a chemical raw material is shown in Fig. 1. The major components, presently employed for chemical use, are propane and butane-butylene mixtures. This study indicates that a total of 110,895,000 gals., of LP-Gas, as a liquid, was used as a chemical raw material in 1943. The 1944 requirement is set at 159,788,000 gals., an increase of 44%.

It should be noted that these amounts are for that LP-Gas shipped as a liquid only. Larger amounts of these gases are delivered to chemical plants in the gaseous form by pipelines.

A recent estimate* of the quantity of LP-Gas used as a chemical raw material, delivered as liquid or gas in the United States, indicates that a total of 389,127,500 gals. equivalent was used in 1943. The 1944 requirement, with the latter nine months estimated, was set at a 478,022,000-gal. equivalent, an increase of 23%.

This chemical use of LP-Gas continues to grow with prediction of ever-increasing amounts of ethane-propane and propane-butane mixtures as raw material in processes employing regenerative cracking and catalytic oxidation, respectively.

In the production of newer, better and greater quantities of aviation fuel and to continue to meet essential military and civilian requirements of various fuels and other petroleum products, large quantities of LP-Gas are being used in refinery operations.

In reporting the growing trend of LP-Gas for refinery uses (Fig. 2), security restrictions have necessitated that this classification include not only conventional refining demands but those for isobutane for alkylation and butane for isomerization purposes. This is necessary to eliminate any possible prediction relating to increased alkylation production. Nevertheless, the



DR. R. W. LESLIE



L. ABRAMSON, JR.

increased use of LP-Gases for total refinery uses reflects their growing importance in the production of aviation fuel components.

In 1943, 1,558,209,000 gals. of LP-Gas were used for refinery operations and 2,327,208,000 gals. estimated in 1944. This increase of 768,999,000 gals. (about 50%) is of interest when compared with total sales of LP-Gases in the United States for 1943 of 675,233,000 gals. as reported by the United States Bureau of Mines.*

This large use of LP-Gas in refinery operations can be expected until total victory. The termination of the war in Europe should not bring any reduction in the manufacture of key aviation fuel components such as iso-octane alkylate, even though the total production of finished aviation fuel may be temporarily reduced until the concentration of the total war effort is established in the Pacific Area.

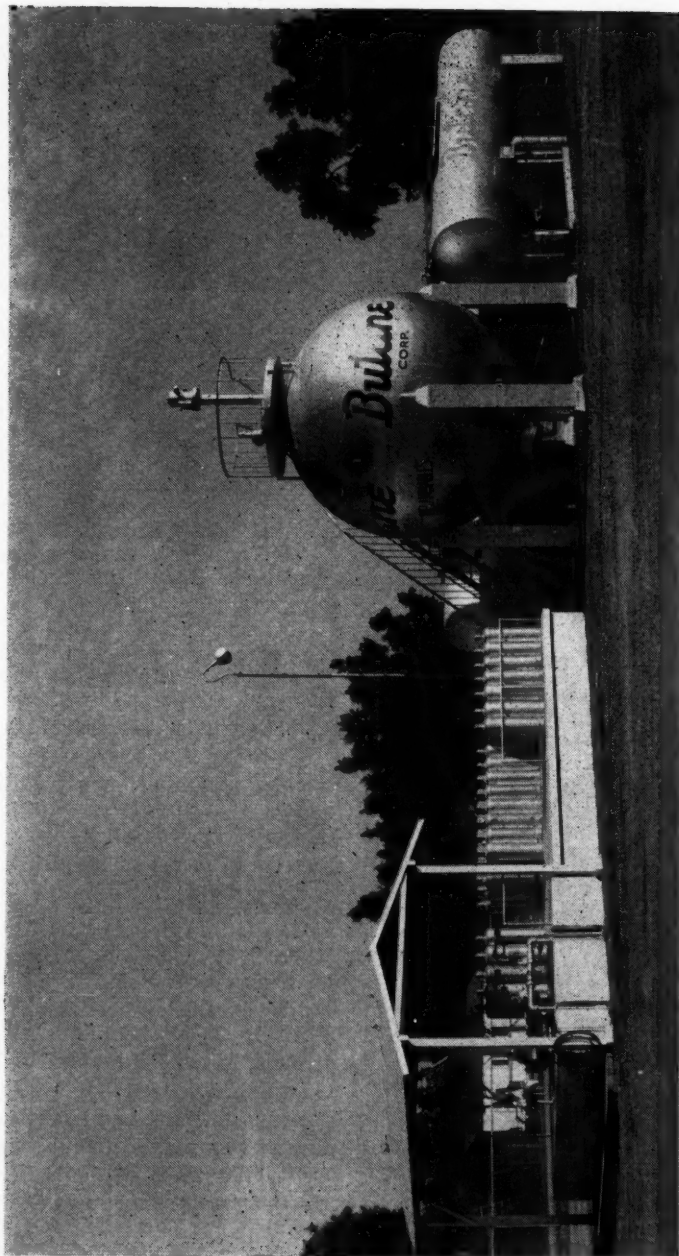
Another burden placed upon bu-

(Continued on Page 81)

* "Science in Natural Gas" by James E. Pew and Frank H. Dotterweich, Petroleum Administration for War.

* Mineral Market Report No. MMS 1204, United States Bureau of Mines, July 15, 1944.

Substituting Propane for Butane in Arizona



Bulk and cylinder-filling plant of Butane Corp. at Phoenix has artistic as well as practical appeal. This spherical propane tank has a capacity of 16,000 gal., water capacity.

High Pressure Storage

Paves Way for Consumer Changeover

PPROMPTED by the shortages of butane for civilian uses because of the war demands upon that fuel, the Butane Corp., of Phoenix, Ariz., is changing over to propane tanks its entire bulk plant as rapidly as possible.

According to W. T. Joplin, president of the firm, this is not only an important move to make to provide fuel to existing customers during the war period, but with higher pressure storage installed permanently, there will be a guarantee against fuel lack should any butane shortage develop in later years.



W. T. JOPLIN

Needs Justified Allocation

While it has been difficult at this time to secure materials to construct the new, 16,000-gal. spherical propane tank featured in the picture on the opposite page, so many essential industries in and near Phoenix are using liquefied gas, and so many workers have located there who can obtain no other domestic fuel, the Petroleum Administration for War approved the installation.

The spherical propane tank is 16

ft. in diameter, 1 1/8 in. thick, and was fabricated on the ground by the Chicago Bridge & Iron Co. It is of 250 lbs. working pressure.

The weight of the tank rests on upright steel supports which were bricked in, allowing air space around the steel for the purpose of fire-proofing them. As it now stands, it would take a terrific amount of heat on the brick to affect in any way the steel supporting the tank.

Liquid Level Easily Figured

Installed on the top is a Shand & Jurs visible gage which is operated on a float, giving the liquid level of the tank by merely looking at the gage. This figure is readily converted into gallons through a calibration chart showing the number of gallons for each 1/8-in. of depth.

The suction line to the tank is a 3-in. line through a three-way valve into a Smith pump, which is propelled by a 7 1/2 hp. explosion-proof motor, which is also tied into a 3-in. discharge line into the storage tank. All switches and lights are vapor proof.

When a tank car is unloaded, a simple half-turn on the valve converts the discharge valve into a suction line back to the pump for discharging into cylinders or through a Brodie meter to the fuel tanks of motor vehicles. In filling

small cylinders, which are filled by weight with the pump, a 2-in. bypass line going back into the tank is used. This prevents re-circulating of the gas and keeps the gas in the pump cool. This method enables filling a 100 lb. cylinder in two and one-quarter minutes. The plant will be equipped with four sets of scales which will permit cylinders to be filled and cut off automatically. The capacity will be about 100 cylinders per hour.

Equipped for Automotive Service

To the left of the pump, the meter can be observed where trucks are served with motor fuel including Butane Corp.'s 1000-gal. propane delivery truck which is used to deliver propane in bulk to larger users.

Behind the 16,000 gal. water capacity spherical propane tank can be seen portions of the butane storage which is comprised of five 6000-gal. tanks. Just to the left of the present sphere another sphere, identical with this one, is to be added which will give approximately 26,000 gal. net propane storage.

When this additional storage is completed and tanks and cylinders are available, the company will be in a position to steadily convert present butane users to propane. It is anticipated that over a period of years most of the butane tanks in the background will be removed and replaced with spherical propane storage.

Butane Corp. refills its bulk storage with fuel hauled from Los Angeles in its own transports.

ICC Increases Demurrage To Speed Unloading of Cars

At a session of the Interstate Commerce Commission held on Dec. 23 in Washington, increased demurrage charges were ordered to speed loading and unloading of railroad tank cars.

The Commission declared that tank cars are being delayed unduly in loading, unloading, reconsignment, storage and for other purposes, thus causing a shortage of tank cars in all sections of the United States. The Commission is of the opinion that an emergency exists, requiring immediate action to prevent a shortage of tank cars.

Following 24 hours of free time, demurrage charges shall be \$5.50 per car per day, or a fraction thereof for the first demurrage day; \$11 per car per day for the second demurrage day; and \$22 per car per day for each succeeding demurrage day.

Amendment Is Issued To Priorities Regulation I

An amendment of Jan. 6 to Priorities Regulation 1 provides that when a person receives notice that a customer's order is no longer rated or is cancelled, he is not required to withdraw extension of the rating to an order for \$25 worth of material or less.

In addition, the amendment restates the rules governing use and disposition of material acquired with priorities assistance.

Where material cannot be so used or disposed of, it may be sold under Priorities Regulation 13 if the proposed sale would constitute a "special sale." If not, the sale is unrestricted as long as all other applicable sections of Priorities Regulation 1, and other WPB orders are observed.

Domestic Uses Required Half of 1944 Marketed Production!

By G. G. OBERFELL

Vice President in Charge of Research, Phillips Petroleum Co., Bartlesville, Okla., and

R. W. THOMAS

Manager, Chemical Products Department, Phillips Petroleum Co.

MARKETED production of liquefied petroleum gases for other uses than synthetic rubber and aviation gasoline is estimated to have increased 110,000,000 gals., or 16.2%, in 1944 to 785,000,000 gals. The estimated increase for LP-Gas purposes was 20,000,000 gals. larger in volume than the increase shown the previous year.

Household (domestic) demand for LP-Gas is estimated to have increased 53,000,000 gals., or 15.5% in 1944 to 392,000,000 gals. In 1943 the increase in household consumption was 39,821,000 gals., or 13.3%, and in 1942 it was 78,837,000 gals., or 35.7%. (See Table 1.)

Wartime restrictions kept new

• It has been customary for many years for G. G. Oberfell, vice president of Phillips Petroleum Co., Bartlesville, Okla., to provide the liquefied petroleum gas industry with an estimate of the marketed production for every preceding year. This survey is made at the close of the old year and appears about six months ahead of the U. S. Bureau of Mines release. Closely accurate, these surveys are important guides to industry trends.

This year, Ross W. Thomas, manager of the Chemical Products Department, of the same company, has helped to prepare the annual figures.

Space limitations prevent publication of the entire report, but the abstract appearing herewith will readily acquaint the industry with the important progress made in 1944.—Editor.



R. W. THOMAS



G. G. OBERFELL

installations at a low level but there was a considerable amount of shifting of equipment from summer cottages and similar seasonal dwellings to the homes of year-around users. Demand also was greater from existing consumers because of economic conditions.

It is estimated that there were 1,950,000 domestic users of LP-Gas on Dec. 31, 1944, an increase of 50,000 during the year. Buried butane installations in the South increased an estimated 16,000 in 1944 to 335,000 and all other types of domestic installations are estimated to have increased 34,000 to 1,615,000.

Industrial fuel, internal combustion engine fuel and miscellaneous uses of LP-Gas rose an estimated

DISTRIBUTION of Liquefied Petroleum Gas

1944—785,000,000 Gals. 1943—675,000,000 Gals. Gain: 16.2%



DOMESTIC

1944—392,000,000 Gals.

1943—339,380,000 Gals.

Gain:

15.5%



INDUSTRIAL, ETC.

1944—193,400,000 Gals.

1943—149,429,000 Gals.

Gain:

18.1%



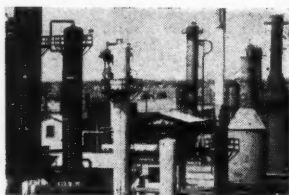
GAS MANUFACTURING

1944—46,000,000 Gals.

1943—37,519,000 Gals.

Gain:

22.6%



CHEMICAL

1944—60,000,000 Gals.

1943—55,356,000 Gals.

Gain:

8.4%



SPECIAL WAR USES

Aviation Gas—2,327,208,000 Gals.

Synthetic Rubber—205,457,000 Gals.

(Reported for first time in 1944 by PAW.)

m Gas
16.2%

Gain:
5.5%

Gain:
1.1%

Gain:
6%

in:
%

ows

44,000,000 gals. or 18.1%, in 1944, compared with an expansion in demand of 41,501,000 gals., or 20.6%, in 1943. Most of the increase in industrial fuel use may be attributed to the fact that war plant consumers were operating during the entire year of 1944, whereas many of these plants did not begin operating until the middle or latter part of 1943.

City Plant Use Increased

City gas plants are estimated to have consumed 46,000,000 gals. of LP-Gas in 1944, an increase of 22.6% over 1943. This was greater than the 19.6% increase in 1943 largely because of the use of LP-Gas for cold enrichment and underfiring of coke ovens in several large cities.

One city gas plant stored liquefied petroleum gas at low pressure in undiluted form. No high pressure liquid storage tanks were available so the company allocated a 3,000,000 cu. ft. gas holder to butane and propane storage. As tank cars were received the butane or propane was vaporized in a conventional heat exchanger and undiluted vapor pumped into the holder at six inches water column pressure. The gas holder acted as a standby from which gas was withdrawn at peak load periods, diluted and added to the send-out stream. By storing 3200 Btu. butane vapor instead of 530 Btu. gas the capacity of the holder was expanded in effect from 3,000,000 to 18,000,000 cu. ft. of 530 Btu. gas. At present the holder is being used for the storage of undiluted propane vapor. This is be-

cause butane is unavailable now in adequate quantities.

Utilization of LP-Gas for chemical manufacturing is estimated to have increased about 5,000,000 gals. in 1944 to 60,000,000 gals. Chemical sales represented 7.7% of total LP-Gas utilization compared with 8.2% in 1943 and 9% in 1942. These figures do not, of course, include normal butane or butenes used in the production of butadiene for synthetic rubber. No estimate is included to cover natural isobutane or normal butane isomerized by catalytic processes to isobutane or C_3 and C_4 unsaturates produced by cracking and alkylated with isobutane for the production of 100 octane aviation fuel.*

Motor Fuel Was Sacrificed

The large number of gallons per day of C_4 hydrocarbons now used by rubber and aviation gasoline suggests that there will be a tremendous over-supply of butanes for LP-Gas once the Pacific war is over. It should be remembered, however, that the oil refining industry has been robbing motor fuel of volatility in order to feed the modern war machines in the same way that the LP-Gas industry has limited its sales to make butane available to fight the enemies of our country. When the war is over, gasoline quality for civilians will be improved.

Also, it is probable that war-developed techniques of C_4 utilization in aviation gasoline undoubtedly will be adapted to peacetime

* See survey report of PAW (Page 17) for this information.

gasoline production. Aviation gasoline demand will not be significant when compared with war demand but at least some alkylation plants will consume very large quantities of butanes in the production of automobile gasolines of higher quality. Early in the war period, steel was more critical than butane because neither the 100-octane plants nor the synthetic rubber plants were on stream. In the latter half of 1944,

however, the steel situation eased and new 200-lb. working pressure tanks could be obtained for essential purposes.

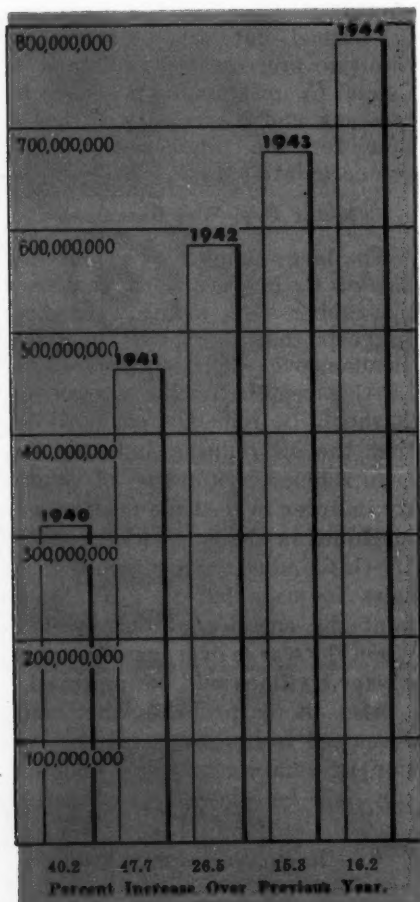
The high level of agricultural operations in the irrigated fields of the southwest created an unusually large demand for LP-Gas in the latter part of the summer, when LP-Gas engines driving irrigation pumps were in use. Dehydrating units for alfalfa and similar products, cotton ginning and other farm uses required great quantities of LP-Gas.

There has been increasing interest by manufacturers of internal combustion engines in the development of an LP-Gas fueled engine.

Considerable additional study is being made of LP-Gas fueled units for air conditioning railroad equipment. It is anticipated that propane fired engines, fans and refrigeration units will be developed further for perishable goods cars so that uniform temperatures may be maintained in transit.

Looking to the postwar domestic market the distributor sees that only a little over 10% of the homes in the United States without gas service have installed LP-Gas. There are about 15,000,000 homes not connected to gas mains and about 2,000,000 homes served by the LP-Gas industry. For several years after the war it is expected that domestic customers will increase at the rate of at least 500,000 per year.

Indications are that the distributors of natural and manufactured gas will look with a more kindly eye on liquefied petroleum gas as a means of building loads in growing



WE SALUTE A GRAND



list of distributors

We are proud to present this group of high-powered Specialty Distributors—each a leader in his marketing area—who now handle the wholesale distribution of Grand Gas Ranges.

Alabama-Florida Distrib'g Co., Birmingham, Ala.
 American Sales Company, Columbus, Ohio
 American Sales Company, Dayton, Ohio
 Apollo Distributing Company, Newark, N. J.
 The Artophone Corporation, St. Louis, Mo.
 Bickford Brothers Company, Rochester, N. Y.
 Billings Hardware Company, Billings, Montana
 Buhl Sons Company, Detroit, Michigan
 Cleveland Distributing Company, Cleveland, Ohio
 Columbia Wholesalers, Inc., Washington, D. C.
 Dulaney Distributing Co., Oklahoma City, Okla.
 Eskew, Smith & Cannon, Charleston, West Virginia
 Federal Distributing Company, Kansas City, Mo.
 Federal Distributing Company, Wichita, Kansas
 I. Feldman Company, Providence, R. I.
 Flint Distributing Company, Salt Lake City, Utah
 Gerlinger Equipment Co., Toledo, Ohio
 Griffith Distributing Company, Cincinnati, Ohio
 Griffith Distributing Company, Indianapolis, Ind.
 Holcomb Gunn, Inc., Little Rock, Arkansas
 Hozel-Powers, Inc., Albany, New York
 Kentworth Corporation, Louisville, Kentucky
 Lisenwalter & Gough, Inc., Los Angeles, California
 Major Appliance Company, Omaha, Nebraska
 McClain Distributing Company, Charlotte, N. C.
 McDonald Brothers, Memphis, Tennessee

Morris Distributing Company, Syracuse, New York
 Morris Distributing Company, Binghamton, N. Y.
 Morrow-Thomas Hardware Co., Amarillo, Texas
 Motor Power Equipment Co., St. Paul, Minnesota
 Mullin Furniture & Appliance, Dodge City, Kansas
 Northeastern Distributors, Inc., Boston, Mass.
 Radio City Distributing Company, Dallas, Texas
 Radio & Appliance Distributing Co., Denver, Colo.
 Radio Specialty Company, Milwaukee, Wisconsin
 Radio Specialty Corporation, New Orleans, La.
 Raub Supply Company, Lancaster, Pennsylvania
 Raub Supply Company, Harrisburg, Pennsylvania
 Roskin Brothers, Inc., Middletown, New York
 Roskin Distributors, Inc., Hartford, Connecticut
 A. A. Schneiderhahn Company, Des Moines, Iowa
 Southern Equipment Company, San Antonio, Texas
 Joseph Strauss, Inc., Buffalo, New York
 The Switz Company, Evansville, Indiana
 Thompson & Holmes, Ltd., San Francisco, Calif.
 Times Appliance Co., Inc., New York, N. Y.
 Wakem & Whipple, Inc., Chicago, Illinois
 W. G. Walz Company, El Paso, Texas
 W. G. Walz Company, Phoenix, Arizona
 The Wayne Hardware Co., Fort Wayne, Indiana
 J. A. White Distributing Co., Grand Rapids, Mich.
 J. A. Williams Company, Pittsburgh, Pennsylvania
 Young Brothers, Erie, Pennsylvania
 The Yancey Company, Inc., Atlanta, Georgia
 Jos. M. Zamoiski Company, Baltimore, Maryland

**WHEN PEACE COMES
 IT WILL BE *Grand***

Grand

GAS RANGES •

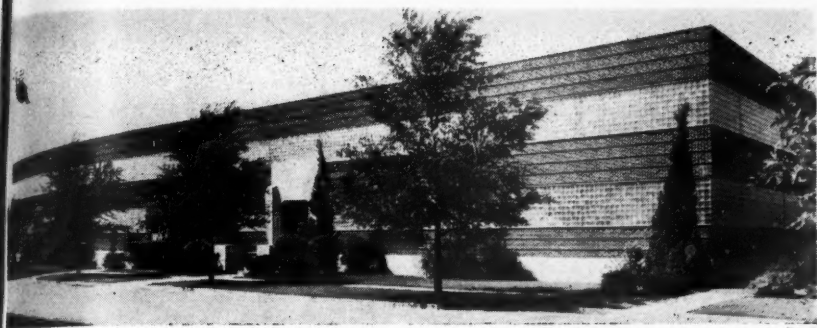
GRAND HOME APPLIANCE CO.
 CLEVELAND, OHIO

TABLE 1. MARKETED PRODUCTION OF LIQUEFIED PETROLEUM GAS

Year	TOTAL SALES		Distribution—Gallons Per Year					
	Gallons Per Year	Per Cent Increase Over Previous Year	Domestic	Per Cent Increase Over Previous Year	Industrial and Miscellaneous	Gas Manufacturing	Per Cent Increase Over Previous Year	Chemical Manufacturing
1922.....	222,641							
1923.....	276,863	24.4						
1924.....	376,488	36.0						
1925.....	403,674	7.2						
1926.....	468,085	15.2						
1927.....	1,091,005	134.6						
1928.....	4,522,899	314.6						
1929.....	9,930,964	119.6						
1930.....	18,017,347	81.4						
1931.....	28,769,576	59.7						
1932.....	34,114,767	18.6						
1933.....	38,931,008	14.1						
1934.....	56,427,000	44.9						
1935.....	76,855,000	36.2						
1936.....	106,652,000	38.8						
1937.....	141,400,000	32.6						
1938.....	165,201,000	16.8						
1939.....	223,580,000	35.3						
1940.....	313,456,000	40.2						
1941.....	462,852,000	47.7						
1942.....	585,440,000	26.5						
1943.....	675,233,000	15.3						
1944.....	785,000,000	16.2						
			Sale of liquefied petroleum gas confined primarily to bottled gas business prior to 1928					
			2,600,000	400,000	1,500,000	
			5,900,000	126.9	1,500,000	2,500,000	66.7	
			11,800,000	100.0	2,200,000	4,000,000	60.0	
			16,294,648	29.6	7,171,686	6,303,242	57.6	
			16,244,103	6.2	8,167,194	9,703,470	53.9	
			16,625,588	2.3	13,987,095	8,318,325	-14.3	
			17,681,000	6.3	32,443,000	6,298,000	-24.3	
			21,380,000	20.9	47,894,000	7,581,000	20.4	
			30,914,000	40.4	67,267,000	9,371,000	23.6	
			40,823,000	36.0	62,610,000	11,175,000	19.3	26,792,000
			57,832,000	41.7	62,694,000	12,386,000	10.8	32,299,000
			87,530,000	51.4	93,723,000	15,435,000	24.6	26,892,000
			134,018,000	53.1	124,482,000	20,285,000	31.4	34,671,000
			220,722,000	64.7	172,669,000	25,255,000	24.5	44,206,000
			299,569,000	36.7	201,477,000	31,366,000	16.7	53,038,000
			339,380,000	13.3	242,978,000	37,519,000	19.6	55,356,000
			392,000,000	15.5	287,000,000	46,000,000	22.6	60,000,000

* Not comparable due to segregation of chemical manufacturing.

Remarks: In the above table "Total Sales" for all years except 1944 were obtained from U. S. Bureau of Mines reports. "Distribution" for the years 1931 to 1943, inclusive, was obtained from the same source. All other volumes are estimated by the writer. The total sales volume includes all liquefied petroleum gases (propane, butane, and propane-butane mixtures) when sold as such. It includes the sale of pentane when sold for any purpose other than motor fuel blending. It does not include butane when blended with heavier petroleum fractions for motor fuel purposes. Inter-company sales transactions such as purchases of liquefied petroleum gases by one company from other companies and then resale as liquefied petroleum gases, are included directly by the producer at the point of sale. Sales of liquefied petroleum gas for use in the manufacture of synthetic rubber or aviation gasoline or their components. of hydrocarbons to plants manufacturing synthetic rubber or aviation gasoline, etc. Neither do the figures include sales



Research Laboratory of Phillips Petroleum Co. at Bartlesville, Okla.

communities pending the development of a market dense enough to lay city gas mains. They see in this a means of better meeting the competition of electricity.

As a result of the war emergency, distributors in the South where LP-Gas is used for space heating as well as cooking, water heating and refrigeration, are becoming increasingly aware of the burden thrown on the industry by peak winter loads. Before the war, filling during the summer of new domestic consumer tanks tended to level out the demand curve to some extent but now, with new installations a minor factor, the industry sees more clearly the effect of peak demands running 3 to 5 times as great in the December-February period as in the summer.

The liquefied petroleum gas industry has shown a more cooperative spirit during the past year than ever before. Necessity for group study of the acute problems arising from the war has been at least partly responsible.

The Transportation Committee of

LPGA met with officials of the Petroleum Administration for War, Office of Defense Transportation, and Interstate Commerce Commission early last year during the transportation crisis. The committee was instrumental in the conversion of 600 low pressure cars for the movement of normal butane, butane-butenes and isobutane for war purposes so that the LP-Gas cars commandeered for this service could be returned to their usual service. Later the committee was instrumental in having 400 new propane cars built.

Looking forward to 1945 it is clear that the industry will be operating under peak load conditions as long as the global war continues. All elements in the industry will find it essential to keep load building installations at an absolute minimum. When the German war is over the expected cancellation of war contracts should ease the supply and transportation situation on propane but not on butane. Butane is expected to be scarce until Japan is beaten.

Backlog of 300 Orders Helps Dealer Keep Up War-Time Morale

By O. D. HALL

WITH only two employees, C. E. Conrad, Midwest Butane & Engineering Co., Tulsa, Okla., is managing to keep three LP-Gas trucks in operation over territory extending 100 miles surrounding his headquarters office. In addition, he services the appliances and equipment of his customers. And to tide over the period of low sales on appliances, he operates an automobile repair shop.

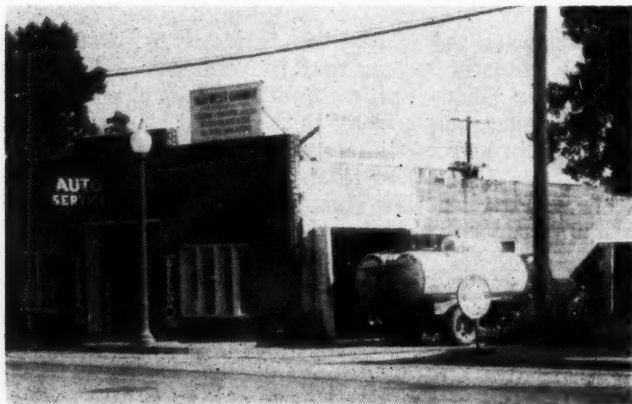
"My friends and customers call me a one-man utility," observed Mr. Conrad, "and I guess this name fits, for I average 110 hours a week handling one phase or another of my business."

Preparing to drive one of his butane delivery trucks into the country when this writer arrived at his office, Mr. Conrad stopped long enough to tell his story of how he has managed to maintain a going concern amidst manpower, equipment and materials shortages during the war period.

While he was being interviewed, a farmer walked in and asked if he could buy a butane system for his home. The applicant admitted that he had other fuel but that it was too expensive and that he did not want to go through the winter without butane.

Mr. Conrad frankly told the farmer that he could not qualify for a priority rating but that he would take his application for a system if he cared to wait until restrictions eased. He told the prospective customer, however, that he should feel perfectly free to try to secure the installation from other sources and gave him the names and addresses of some other dealers.

This frank attitude and manifestation of unselfish interest impressed the



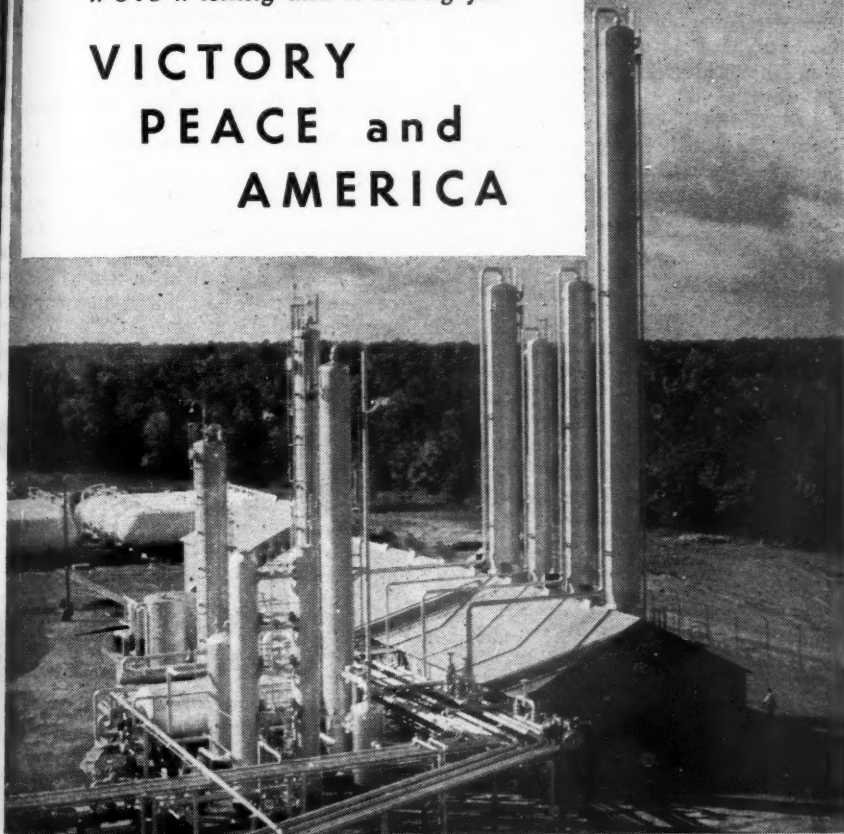
Headquarters of Midwest Butane & Engineering Co., Tulsa, Okla., and automobile service shop under the same roof. Twin-engine LP-Gas truck at the entrance waiting to be driven into the country by C. E. Conrad, the manager and owner.

WARREN

LIQUEFIED PETROLEUM GAS

We're Wishing and Working for

VICTORY
PEACE and
AMERICA



WARREN PETROLEUM CORPORATION

Tulsa, Oklahoma

farmer. He volunteered to seek no further, but to wait until Mr. Conrad could make the installation. He gave the dealer a deferred order and departed apparently satisfied.

"This is only an example of what is happening almost daily," said Mr. Conrad, pulling a sheaf of papers from a file. "Here are more than 300 applications for equipment, installations and appliances from customers and prospective customers who are patiently waiting for the shortages to end so that they may enjoy the full benefits of LP-Gas service. In addition I have hundreds of inquiries from people who say that they would like to change to LP-Gas. This is why I have great faith in the future of this business and why I am willing to work long hours and struggle against odds to keep our present customers going."

Service Men Get Preference

Mr. Conrad also has to contend with a shortage of skilled manpower. However, he expects this situation to ease as more of the veterans of the war return. Former service men will be given preference by the company. By putting such employees through a course of training, Mr. Conrad says he can develop them into skilled assistants, and at the same time do his share to help solve the unemployment problem which may develop after the war.

Price Ceilings on Commercial Trucks Unchanged for 1945

The prevailing 1944 price ceilings on used commercial motor vehicles will be continued throughout 1945 and present used passenger car prices will be maintained until July 1, 1945, under the terms of late amendments to OPA Maximum Price Regulations Nos.

341 and 540, respectively.

Used commercial vehicle ceilings were scheduled to be dropped to the next older model year ceiling price at the beginning of the new year, and used passenger car ceilings were to be reduced by 4% each six month period.

The continuance of the present ceilings for both used commercial vehicles and passenger cars was considered necessary by OPA in order to keep the market stocked with largest possible inventory that restricted production will permit.

NGAA Plans Spring Meeting For April 11-13 in Dallas

The Natural Gasoline Association of America has tentatively set April 11-13 as the dates for its annual spring meeting in Dallas, Texas. Before assurance can be given that the convention will be held, approval must be obtained from the ODT. The decision will hinge upon what may be deemed the importance of the meeting to the war effort.

No open sessions are scheduled for Wednesday, April 11, since the day has been reserved for committee meetings. Attending these meetings will be members of the several technical groups of the NGAA, including the high pressure gas division, and the board of directors. The meetings will start in the morning and at least one will probably run into an evening session.

However, general registration will probably start Wednesday morning as usual.

General open sessions will begin Thursday morning and run through the afternoon, closing in time for the NGSMA entertainment that evening. Friday will have general sessions until about four o'clock in the afternoon.

QUIZ

What Are Liquefied Petroleum Gases?

• This department is a monthly feature to stimulate thought and to give operators basic industry facts. Clip out for your notebook or file in a standard, 3-ring, loose-leaf binder. Sources of information: The Bottled Gas Manual, Handbook Butane-Propane Gases.

Questions

Answers

1

What are butane and propane?

They are two of the hydrocarbons of the paraffin series and are found in conjunction with natural gas and crude oil. Chemical formulas: Butane— C_4H_{10} . Propane— C_3H_8 .

2

How are butane and propane utilized and handled?

Under normal atmospheric conditions they are gases and are utilized in that form. However, their characteristics are such that they can be liquefied by moderate pressure and they are transported and stored in liquefied state. Butane boils at $31.1^\circ F$; propane, $-43.8^\circ F$.

3

What other products of special interest to the liquefied petroleum gas industry are recovered from wet gas and crude oil beside butane and propane?

Pentane, with a boiling point at atmospheric pressure of $97^\circ F$; isobutane, with a boiling point of $10^\circ F$; natural gas (mixture of methane and ethane), with boiling point of $-256^\circ F$.

4

For how long a period will there be ample supplies of butane and propane?

These fuels will be available as long as natural gas and crude petroleum are produced. Present known sources will last for generations and undoubtedly new fuels will be developed in America and other countries. Many refineries and natural gasoline plants are still unequipped to fractionate available LP-Gas.

5

Why is liquefied petroleum gas a superior, all-purpose fuel?

It is clean, speedy and dependable. It can compete favorably in price with all modern fuels. And it can be installed in localities now without gas mains or electricity.

6

What are the comparative Btu.'s per pound and gallon of butane and propane?

Btu.'s per pound:
Butane—21,338
Propane—21,692

Btu.'s per gallon:
Butane—103,703
Propane—91,757

7

How does liquefied petroleum gas compare with natural and manufactured gas from a safety standpoint?

Limits of inflammability of commonly used gases, showing percentage of combustible gas in mixture with air:

Butane:	Propane:
Lower—1.5 to 1.9	Lower—2 to 2.4
Upper—5.7 to 8.5	Upper—7 to 9.5
Methane:	
Lower—4.9 to 6.2	Upper—12.7 to 16.0
Ethane:	
Lower—3.0 to 3.3	Upper—10.6 to 15.0
Coal Gas: 4.5 to 19.0	Acetylene: 2.0 to 80.0
Carbureted Water Gas: 5.0 to 46.0	

This shows that butane and propane have narrower explosive ranges than any other gases named above.

8

What industrial operations can be handled successfully by liquefied petroleum gas?

Practically all. It excels in annealing, brick and tile burning, bronze melting, carburizing, core baking, forging, frit melting, heat-treating, drying operations, metalizing, vitreous enameling. It leaves no scale and a constant heat input is easy to accurately control.

9

Where does liquefied petroleum gas stand in relation to other fuels in its responsibility for fires?

Last. Electricity causes by far the greatest fire damage. Next comes, in order, oil, wood, coal and finally, gas.

10

If a dealer or distributor of liquefied petroleum gas is purchasing new storage and transport facilities, should he buy low or high pressure containers?

High pressure, which will withstand the pressures of propane and propane-butane mixtures. A propane container can always be used for butane but one constructed for butane, only, can not be used for straight propane or mixtures of the two.

SUBJECTS TO BE COVERED IN FORTHCOMING ISSUES: ● The Behavior of Gases ● Heat and Temperature ● Tanks and Cylinders ● The Simple Regulator ● Regulator Manifolds ● How to Buy and Install Equipment ● Pipe Lines ● Testing for Leaks. Burner Adjustment ● Thermostats, Pilots and Pilot Controls ● Burner Design and Application ● Appliance Conversions.

We're ready TO TALK BUSINESS—

What does the future hold in store for the appliance industry? Will it be a sellers' Utopia of easy sales and lush profits? Or will the tremendous manufacturing capacity developed by the war create a bitterly competitive market?

Forward looking distributors and dealers are asking themselves these questions now.

Globe American is ready to talk business now with distributors and dealers whose thinking carries beyond the honeymoon period—who discount the much talked of reser-

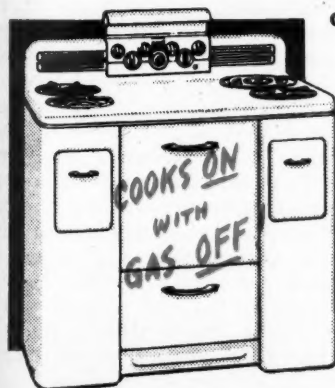
voir of buying power—and who are looking forward to a successful future based on hard hitting salesmanship.

The Dutch Oven Gas Range will be so advanced in cooking methods, in style and design, in engineering and performance, and especially in value, that it cannot help but be the logical choice of millions of families needing new cooking equipment.

If you are seeking a product that offers unparalleled sales opportunities over a long period—let's talk business now!

Here's Why You Should Investigate Dutch Oven Now!

- 1 Every appliance dealer who will pretend to have a complete post-war line **MUST** have a retained-heat gas range.
- 2 Dutch Oven offers the **ONLY** completely automatic retained-heat gas range.
- 3 Dutch Oven is A.G.A. approved for Natural, Manufactured and LPG gases—it is the ideal range for the urban, suburban and rural markets.
- 4 New, exciting, exclusive sales stimulating features are the backbone of the Dutch Oven story.
- 5 Dutch Oven has consumer acceptance. National advertising will continue to expand the demand for Dutch Oven Ranges.
- 6 The Dutch Oven franchise will be one of the most valuable and profitable in the entire industry.



GLOBE AMERICAN CORPORATION

Kokomo, Indiana

General Sales Office

800 Field Bldg., 135 S. LaSalle St.
Chicago 3, Illinois

Dutch Oven

Gas Ranges

Natural—Manufactured—Bottled

Only Dutch Oven automatically turns off the gas and keeps right on cooking

CURRENT READING

● Reviews of new books, pamphlets and articles published in recent magazines of interest to technicians and executives in the liquefied petroleum gas industry. Those interested in reading any complete article or book should write to the publications named.

Fischer-Tropsch Synthesis and the Gas Industry—V. I. Komarewsky and C. H. Riesz. "Petroleum Refiner," Nov., 1944, pp. 91-98. The Fischer-Tropsch synthesis or modifications thereof appear to have important implications for the gas industry: 1. It represents a means of upgrading gas; 2. A new use for gas is developed; and 3. The enrichment of water gas can be made independent of petroleum. The last item is important from the viewpoint of the industry as well as in the interests of obtaining complete national self-sufficiency in regard to liquid fuels.

Separation of Mixtures of Butadiene and 2-Butene—I. L. Fridshtein, A. F. Tyul'neva and M. K. Sofanov, "National Petroleum News," Nov. 1, 1944, pp. R-784-786, 788. Authors' conclusions are as follows: 1. The best method of separation of butadiene and 2-butene consists in formation of the compound of butadiene with cuprous chloride; 2. For industrial purposes, neutral concentrated solutions of cuprous chloride containing 200-250 kg. cuprous chloride per cu. m. are the most advantageous; 3. Adsorption of butadiene with this solution should be carried out at 10-15°C. and atmospheric pressure. Under these conditions, the content of butadiene in the

2-butene leaving the apparatus does not exceed 2.5-3.5%; 4. Butadiene is rapidly and completely eliminated from the complex $\text{CuCl}_2\text{-C}_4\text{H}_6$ by heating to 80°C. The liberated gas contains 85 to 98% butadiene; 5. Reduction of the cupric chloride formed by oxidation is easily achieved with the aid of hydrochloric acid and copper shavings; 6. This method may be successfully used in the synthetic rubber industry for separation of 2-butene and butadiene in gases containing more than 5% butadiene.

Correlation of Vapor-Liquid Equilibria Data for Hydrocarbons—C. O. Miller and R. C. Barley. "Industrial and Engineering Chemistry," Nov., 1944, pp. 1018-1021. Empirically it has been found that, for the n-paraffin hydrocarbons from propane through n-octane, the vapor fugacity f_v is a single function of total pressure at conditions of constant liquid fugacity. It was known previously that, for a given substance, liquid fugacity f_L is a single function of temperature. By employing these two relations, values derived from the experimental vapor liquid equilibria data of Katz and Hachmu'h have been correlated. The correlation is presented in the form of an alignment chart with scales for temperature, pressure, and equilibrium constants ($K = y/x$) and points representing various light hydrocarbons. The chart includes n-paraffin hydrocarbons C_1 to C_{14} and several lower olefins over a temperature range of -10° to $+70^\circ\text{F}$. and a pressure range of 1 to 500 lbs. per sq. in. absolute. It

is recommended for use with mixtures of adjacent hydrocarbons—e.g., C_1 to C_8 as in distillation, and for lighter components dissolved in heavier. Other incidental uses are in estimation of vapor pressures and extrapolation of vapor-liquid equilibria data.

Conversion of Hydrocarbons into Butadiene—G. Egloff and G. Hulla. "Chemical Reviews," Oct., 1944, pp. 279-333. This article covers the use of hydrocarbons as source material for the production of butadiene and also notes both experimental and theoretical work on the subject. The authors hope that the ideas submitted will be useful in connection with further development of the synthetic rubber industry. A bibliography of 167 references is appended.

Design of Pressure Vessels Limited by Inspection Requirements—G. Stevenson. "Product Engineering," Nov., 1944, pp. 773-775. Variations in requirements of different localities from the A.S.M.E. code for unfired pressure vessels are summarized for the benefit of designers of such equipment.

Postwar Section. "Oil and Gas Journal," Nov. 18, 1944, pp. 151-182. A special 32-page section in which the editors present a study of the demand and supply outlook, and the technical progress that will implement the industry's program when hostilities cease.

Butane Dehydrogenation by Houdry Process—R. C. Lassiat and F. D. Parker. "Petroleum Refiner," Nov., 1944, pp. 85-90. The Houdry adiabatic catalytic dehydrogenation process has made available to the petroleum refining, petrochemical and natural gas-oline industries a means for convert-

ing paraffins from ethane through pentane to olefins and diolefins. Other dehydrogenation reactions of commercial interest can be handled by the process. Commercial operation of the Houdry adiabatic dehydrogenation process for the production of butadiene proves the feasibility of the process. Large potentialities for production of chemicals from petroleum are opened up, and it is therefore expected that the process will find application in postwar dehydrogenation projects. The process is described. Yield figures are given.

Considering U. S. Reserves, Is Natural Gas Tomorrow's Fuel?—B. C. Adams, Jr., and F. H. Dotterweich. "Industry and Power," Nov., 1944, pp. 56, etc. The authors show by facts and figures that natural gas will continue as a major source of industrial fuel. With estimates of gas reserves ranging from 110 trillion cu. ft. to as high as 300 trillion cu. ft., petrochemical requirements can be met without serious drain on gas available for fuel.

Viscosity of Liquid Styrene and Butadiene—D. A. Edwards and C. F. Bonilla. "Industrial and Engineering Chemistry," Nov., 1944, pp. 1038-1040. The viscosity of liquid styrene and liquid butadiene monomers was determined in Ostwald type viscometers over a useful range of temperatures. The primary purpose of the experiments was to obtain values of viscosity which are sufficiently accurate for the design of heat transfer equipment involving these compounds.

How Carbon Dioxide Conquers Fire—H. V. Williamson. "Petroleum Refiner," Nov., 1944, pp. 123-126. A discussion of the uses of CO_2 in extinguishing petroleum fires.

Poultry Brooding With LP-Gas

Market Analysis

OLD MOTHER HEN, as she industriously scratches for the early worm, or clucks to her scattered brood (if she has not gone entirely modern), neither knows or cares that her inbred proclivity for the propagation of her kind has been exploited by man for the benefit of his kind. She is not alone in her ignorance, for you and I, as we eat our morning order of ham and eggs little realize that we are paying tribute to an enormous business which annually provides the American farmer with a cash income of over two billion dollars, over 402 million dollars' worth of and in addition provides him with foodstuffs for his own table.

The American poultry business involves the handling of billions of dollars each year.* In normal times the value of poultry products exceeds that of the wheat crop. Chickens rank third, next to hogs and cattle, as a source of food.

What has liquefied petroleum gas contributed toward building this enormous business, and how may it expect to derive dividends from it?

* Compton's Encyclopedia.

By C. C. TURNER

Special Representative,
Butane-Propane News

Inasmuch as it has developed to a large extent right under our very noses without our having adequate knowledge of it, one might say that we have not seen the forest because of the trees! What are the facts! I know that statistics make dry reading, but in this instance they are so spectacular that they command attention. Tab. 1 (Pages 48, 50, 55) have been compiled from statistical data supplied by the United States Department of Agriculture. They are extremely conservative, for the Department has no means of determining the size or number of thousands of "backyard" flocks which are not reported.

Let us look at the figures under "Totals" for page 1943:

54,165,000,000 Eggs
3,410,151,000 Chickens
251,649,000 Broilers

All of this was the *reported* production in 1943. Add at least 25% to this for unreported flocks.

If we transfer the job of brooding into gallons of liquefied petroleum gas required on the basis of 0.061 gallons per chicken brooded* we arrive at the astounding total of 279,212,250 gallons for this job, alone. This is about 41%** of our total consumption of liquefied petroleum gases in 1943 for all purposes, including gas manufacturing, enrichment, industrial, and commercial purposes in addition to our stable domestic load!

Competition Is on the Job

Is, or isn't, this load worth going after? Already the electric companies are bidding strongly for it, although we can show a lower cost per chick and better results in brooding. We have already lost the incubating load to them because of our lassitude, but can redeem a part of it through conversion of the smaller incubators which are still heated by oil, coal and wood.

Not only do we want this load because of the profits involved; we also need it to smooth out some of the seasonal irregularities in gas load as later in this chapter I shall point out to you.

I have just said that we needed the brooding load to smooth out seasonal irregularities in gas load. Let us forget about the poultry business for a few minutes and consider a particular headache of the lique-

fied petroleum gas distributors in nine of the North Central and New England border states.

These are the states of Minnesota, Wisconsin, Michigan, Ohio, Pennsylvania, New York, Vermont, New Hampshire, and Maine. Each year during the warm summer months, thousands of families migrate to summer cottages in these states.

Vacationist Load Too Small

Some of them go in for cooking, refrigeration and lighting by liquefied petroleum gas but far too many of them want this fuel only for cooking. Such users are of doubtful value in that they tie up from \$20 to \$40 worth of gas equipment for an annual gas consumption which averages 100 pounds or less per year. Far too many such accounts cajole the distributors into making unprofitable installations. Higher rates and rentals for seasonal users have in some instances solved this problem, but the fact remains that much valuable gas equipment which could be productive for 12 months each year is lying idle during 10 of those months. The real problem is to find work for this equipment.

These nine states comprise 18.7% of the 48 states and do over 25% of the brooding. In this territory the brooding season does not coincide with the vacation period. A few discerning gas operators have recognized this fact and have designed their camp installations so that they are portable and can be quickly removed and transferred onto brooding jobs.

These nine northern states are

*Based on experiments conducted by the University of New Hampshire over an extended period of time in which 0.258 pounds of propane were required per chick brooded.

COMMERCIAL, INDUSTRIAL APPLICATIONS

TABLE 1. CHICKEN, EGG, AND BROILER PRODUCTION IN THE UNITED STATES FOR 1943

STATE	CHICKENS					EGGS					BROILERS					TOTALS				
	Number of Thousands Produced	Cash Value of Those Sold in Thousands of \$	Cash Value of Those Consumed on Farm in Thousands of \$	Total Value in Thousands of \$	Number of Millions Produced	Cash Value of Those Sold in Thousands of \$	Cash Value of Those Consumed on Farm in Thous- ands of \$	Total Value in Thousands of \$	Number of Thousands Produced	Cash Value of Those Sold in Thousands of \$	Total Cash Value in Thousands of \$	Products Sold in Thousands of \$	Poultry Products Consumed on Farm in Thousands of \$	Cash Value in Thousands of \$	Total Cash Value of Poultry Prod- ucts Consumed & Sold					
NORTH ATLANTIC AREA.																				
Maine	24696	5546	528	6074	400	13620	1400	15020	1260	1310	20476	1928	1928	22404	18770					
N. H.	20140	4744	329	5072	322	11792	662	12454	1240	1244	17780	990	990	18770	9351					
Vt.	9276	1934	344	2278	164	5100	832	5932	1230	1141	8175	1178	1178	48667	48667					
Mass.	51401	13082	771	13853	800	30369	1272	31641	3159	3173	46624	2043	2043	269	4362					
R. I.	4996	1243	91	1334	71	2618	198	2816	210	212	4073	289	289	35693	35693					
Conn.	26153	6206	632	6838	448	17010	1012	18022	11140	10835	34049	1644	1644	11315	11315					
N. Y.	108065	27930	4321	32251	2032	66570	7211	73781	5850	5283	99783	11532	11532	2791	51956					
N. J.	46118	12410	1322	13732	940	34607	1489	36076	2325	2148	49165	2791	2791	128055	128055					
Pa.	169986	41378	5462	46840	2611	82172	8430	90602	4875	4505	128055	13892	13892	141947	141947					
TOTALS	460830	114473	13799	128272	7788	263859	22486	286344	31489	29849	408180	36285	36285	444465	444465					
EASTERN NORTH CENTRAL AREA.																				
Ohio	150564	28339	8041	36380	2703	73812	10312	84124	3960	3326	105477	18353	18353	123850	123850					
Ind.	142199	27883	6137	34020	1978	50512	7216	57728	6325	5549	83944	13353	13353	122930	122930					
Ill.	183917	35276	8208	43484	2642	66033	10121	76154	7680	6451	107760	18329	18329	126089	126089					
Mich.	103319	20229	5048	25277	1518	40288	7340	47628	1000	840	61357	12388	12388	73745	73745					
Wis.	121077	21009	4922	25931	2196	58493	7602	66095	1472	1154	80656	12524	12524	93180	93180					
TOTALS	701076	132736	32256	165092	11037	289138	42591	531729	20437	17320	439194	74947	74947	514141	514141					
WESTERN NORTH CENTRAL AREA.																				
Minn.	215034	37592	5357	42949	3477	92546	8488	101034	—	—	130138	13945	13945	149983	149983					
Iowa	290520	55265	8407	63672	3999	104650	10497	115147	—	—	159915	18904	18904	178919	178919					
Mo.	154506	27096	6654	33750	2887	71105	9803	80908	2940	2470	100671	16457	16457	117128	117128					
N. Dak.	60972	10048	1983	12031	637	13770	3213	16983	—	—	23818	5196	5196	29014	29014					
S. Dak.	91404	16584	2372	18956	988	23976	3191	27167	—	—	40560	6863	6863	46123	46123					
Nebr.	148832	25533	4765	30298	1858	45456	5561	51017	—	—	70989	10326	10326	81315	81315					
Kans.	122445	19577	6564	26041	2170	58038	7661	60699	972	722	72437	14025	14025	87462	87462					
TOTALS	1084713	191795	25902	227697	16016	408541	48414	452955	3912	3192	599528	84316	84316	682844	682844					

* Quantity not sufficient to be reported. To values given in thousands and add three ciphers. To values given in millions add six ciphers.

Table 1. Continued on page 20.

THE FIRST ENSIGN CARBURETOR



1911

FARM TRACTOR CARBURETOR



1920

GAS FUEL REGULATOR



1929

BUTANE VAPORIZER



1933

COMBINATION DOWN DRAFT CARBURETOR



1937

THREE NEW BUTANE-PROPANE VAPORIZING UNITS



Model M Model HD Model U

1945

PIONEERS IN EFFICIENT CARBURETION FOR MORE THAN THIRTY YEARS

More than 30 years ago, ENSIGN introduced efficient, economical carburetion for internal combustion engines. Each year that followed, improvements were made or new models became available which covered a greater range of usefulness. • Most of today's ENSIGN

Carburetion Equipment is going to aid our Armed Forces, but a limited supply is available for non-military use. Delivery of repair parts is still maintained. • Remember ENSIGN the pioneer, for your postwar requirements. You can't buy better carburetion at any price.

ENSIGN

CARBURETOR CO., LTD.

HUNTINGTON PARK, CALIF.

Table 1. Continued on page 10.
 • Quantity not sufficient to be reported. To values given in thousands add three ciphers. To values given in millions add six ciphers.

New

COMMERCIAL, INDUSTRIAL APPLICATIONS

TABLE 1. CHICKEN, EGG, AND BROILER PRODUCTION IN THE UNITED STATES FOR 1943

Table 1—Continued from Page 48.

STATE	CHICKENS				EGGS				BROILERS				TOTALS			
	Number of Thousands Produced	Cash Value of Those Sold in Thousands of \$	Cash Value of Those Consumed on Farm in Th- ousands of \$	Total Value in Thousands of \$	Number of Millions Produced	Cash Value of Those Sold in Thousands of \$	Cash Value of Those Consumed on Farm in Th- ousands of \$	Total Value in Thousands of \$	Number of Thousands Produced	Cash Value of Those Sold in Thousands of \$	Total Cash Val- ue in Thousands of \$ of Poultry Products Sold	Total Cash Val- ue in Thousands of \$ of Poultry Products Consumed on Farm	Use in Thousands of \$ of Poultry Products	Total Cash Val- ue in Thousands of \$ of Poultry Products	Use in Thousands of \$ of Poultry Products	Total Cash Val- ue in Thousands of \$ of Poultry Products
SOUTH ATLANTIC AREA.																
Del.	11541	2801	487	3238	122	5676	368	4044	59000	50091	56568	806	57373	56568	806	57373
Md.	34162	7452	1866	9518	410	11696	1871	13567	21000	19018	38366	3737	42103	38366	3737	42103
Va.	65601	10648	6375	17023	1021	24711	6714	31425	22050	19184	54543	13089	67632	54543	13089	67632
W. Va.	25057	3884	2241	6125	526	12447	3486	15933	7000	6339	22670	5727	28397	22670	5727	28397
N. C.	92001	13306	8286	21592	1010	21205	8803	30008	13500	10397	45208	17099	62997	45208	17099	62997
S. C.	34938	4086	5300	9386	326	6025	3670	9695	3750	2617	12928	8970	21898	12928	8970	21898
Ge.	56360	7869	6482	14351	688	14030	6405	20435	16000	11480	33379	12887	46266	33379	12887	46266
Fla.	17382	4518	1071	5589	226	5843	1743	7586	5000	4125	14486	2814	17300	14486	2814	17300
Totals	337592	54764	32058	86822	4329	99633	33060	132693	147300	123751	278148	65118	343266	278148	65118	343266
SOUTH CENTRAL AREA.																
Ky	94897	15423	7141	22564	1288	27434	8858	36292	1150	1035	43892	15999	59891	43892	15999	59891
Tenn.	72025	9826	6135	15961	1171	25214	7878	33092	2500	1988	37028	14013	51041	37028	14013	51041
Ala.	50582	6831	4880	11711	777	15486	5583	22089	---	---	22317	11463	33760	22317	11463	33760
Miss.	57625	8975	4616	13590	643	12548	5174	17722	2078	1534	23057	9789	32846	23057	9789	32846
Ark.	57247	9158	3062	12210	755	14803	6074	20877	14080	11678	35639	9126	44765	35639	9126	44765
La.	38334	4986	5603	10589	390	6913	4177	11090	1540	1003	12902	9780	22682	12902	9780	22682
Okl.	79460	12217	4856	17073	1510	34907	7508	42415	2750	1856	48930	12364	61354	48930	12364	61354
Tex.	151735	23407	10450	33857	3216	74906	15487	90393	10450	6092	104405	25327	130342	104405	25327	130342
Totals	601905	90823	46732	137555	9750	212211	61739	273950	34548	25186	328220	108471	456691	328220	108471	456691

* Quantity not sufficient to be reported. To values given in thousands add three ciphers. To values given in millions add six ciphers.

Table 1 Continued on Page 50.

Table 1 Continued from Page 49

WESTERN AREA											
Mont.	20993	3931	1257	5188	250	5185	1813	6996	---	9116	5070
Idaho	18257	2918	1110	4028	301	7513	1656	9169	---	10451	2766
Wy.	7492	1300	425	1725	106	2310	648	2958	---	3610	1073
Colo.	30719	5163	1446	6609	482	11281	2330	13611	---	16444	3776
N. Mex.	4674	569	529	1098	144	3047	1193	4230	---	3616	1712
Ariz.	4224	962	329	1291	79	2454	491	2945	793	4103	820
Utah	11319	2074	370	2444	322	9366	1146	10612	---	11440	1516
Nev.	1754	332	98	430	36	1078	260	1338	---	1410	358
Nash.	33928	6621	1985	8606	938	30021	3690	33701	1063	37695	5665
Oregon	21393	4070	1276	5345	497	14362	2414	16796	390	18733	3690
Cal.	69232	16740	2856	19595	2090	67415	5697	73112	9299	93454	8553
TOTALS FOR	224095	44680	11681	56361	5245	154082	21318	175370	13963	209972	32999
U.S.	3410161	629271	172528	801799	54165	1423433	229608	1653041	210718	2363422	402136

* Quantity not sufficient to be reported. To values given in thousands add three ciphers. To values given in millions add six ciphers. Figures compiled from United States Department of Agriculture Reports.

not alone in the seasonal problem vacationists thrust upon them. Southern operators have their headaches also. Because of an influx of northerners to the southern resorts at a time when winter and spring brooding are at their height, the solution for these operators is not quite so simple. Then, again, the southern operators go in more for the butane-propane mixtures with underground containers. These, because of physical difficulties as well as legal restrictive measures requiring the retesting of underground equipment before it is reinstalled, preclude its seasonal shiftings.

Equipment Could Be Moved

Perhaps the answer to this situation may be transference of the southern brooding load to propane with portable containers, then an arrangement with northern operators who are not located in brooding areas for the temporary rental of inactive cylinders during the brooding season. One large distributing organization already has such a system in operation.

I have said that we have lost the incubating load to electric competition but that we could retrieve a portion of it. The hatching of chicks has become a business for large operators who specialize in this particular field. Even the large egg, chicken, and broiler producers purchase so-called "day old" chicks from them.

The butane or propane man has not been particularly enthusiastic about going after such business because the fuel consumption involved

Chicken Raisers Need Liquefied Gases For Five Practical Uses

- 1—Brooding
- 2—Incubating
- 3—Waxing
- 4—Singeing
- 5—Delousing

is relatively small in comparison with that of brooding. There are, however, many small poultrymen who tenaciously cling to hatching their own chickens.

Various Methods Are Discussed

Incubators used by such poultrymen are small in relation to those used by their larger "cousins", and they are most generally heated by an oil lamp or by circulating of hot water through coils within the incubator. They are usually manually controlled and operated. Any one of numerous conversion burners on the market may be used to change over such incubators to liquefied gas operation. Accurate temperature control can be maintained by use of a reliable space heating thermostat. Because of the propensity of butane and propane for forming water in combustion, some method of removing a portion of it should be provided as a means of preventing excess humidity. One simple method is to pass the hot combustion gases over a hygroscopic substance before they enter the incubator. Another method of

avoiding excess humidity is to use a side-arm water heater in connection with a surge tank above the incubator and a coil of pipes inside of it. A schematic sketch of such installation is shown in Fig. 1.

Let us suppose that we might get but 2% of this incubating load, practically none of which we possess now. Here would be approximately 34,604,000 more gallons* of our fuel which we might sell. Isn't it worth while for us to go after this?

The wax method of plucking poultry produces a quality dressed fowl which is pleasing in appearance and commands a higher market price, but this method is more expensive than doing the same job with an electric picker, so the cheaper method has almost supplanted it. There are, however, some producers who stick to the wax method because they wish to sell nothing but the best. It is anybody's guess what gas load may be obtained in this particular field, but we would be entirely safe in setting it at not less than 2,000,000 gallons per year!

The poultryman clings to the alcohol torch or a rag soaked with alcohol for singeing purposes in spite of the fact that it is a fire hazard and has caused many a poultry establishment to go up in smoke. Liquefied gas torches, or burner burners of the atmospheric type

*It is extremely difficult to arrive at a consensus of opinion as to the average amount of liquefied gas required per chick for incubation. These figures are based on experiments with 500-chick incubators which averaged 19.7 gals. of liquefied gas during the brooding period.

are entirely practical for this purpose, are fully as cheap to operate, and are much safer. Here again we must venture a guess as to the total possible consumption of gas for this purpose, and we would be safe in setting it at a mere half-million gallons per year!

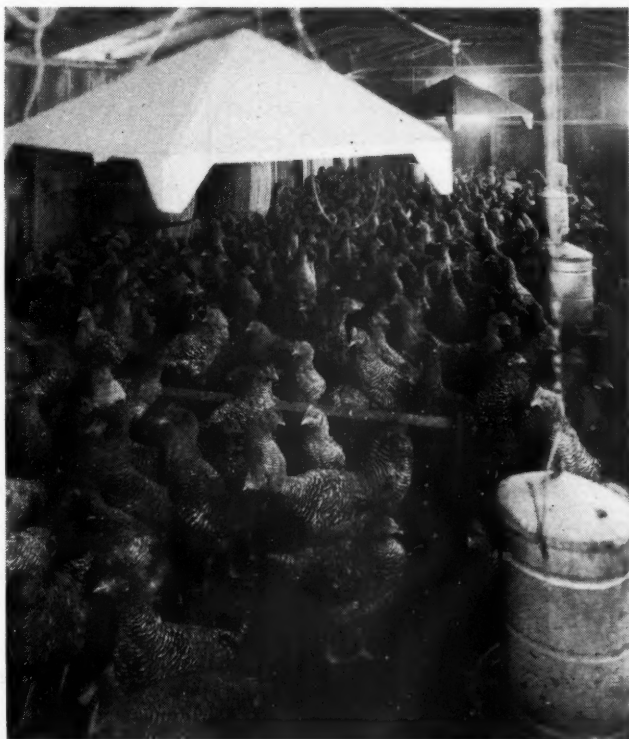
Delousing torches have proved their worth, and they are much quicker and more effective than any of the chemical preparations which have been put on the market for this same purpose. Reasonable precaution must be taken in their use around combustible materials, but when metal containers are removed

for cleaning and disinfecting, the liquefied gas torch is ideal for this purpose.

Every poultryman, regardless of the fuel which he uses for other purposes, is a prospect for torch equipment, and the gas torch is far safer than those which operate on liquid fuels.

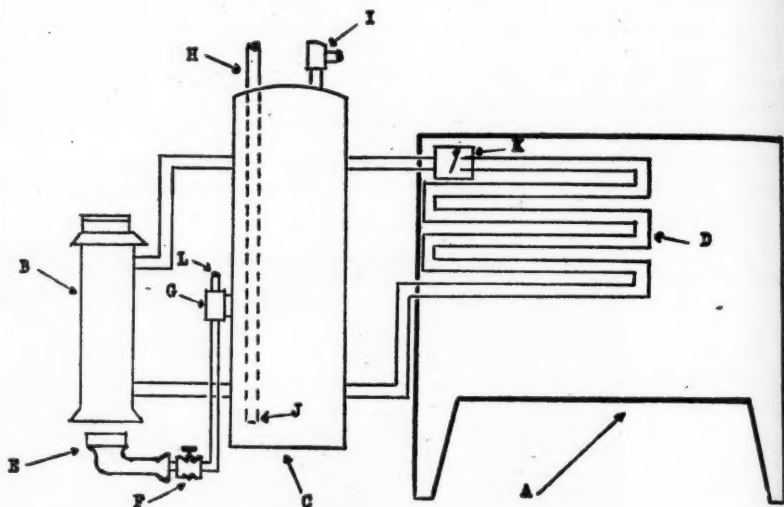
The profits which are to be obtained from appliance and equipment sales in this field alone are inviting. It is conceivable that we can increase by some 4,165,000 gallons our annual sales of liquefied gases in this field alone.

What does it all add up to? First,



This magnificent flock of chickens was raised under butane-burning brooders in Northern Arkansas.

FIG. 1. SCHEMATIC DRAWING SHOWING ONE METHOD OF CONVERTING AN INCUBATOR TO LIQUEFIED PETROLEUM GAS OPERATION BY THE CIRCULATION OF HOT WATER THROUGH A COIL IN THE INCUBATOR.



LEGEND.

- A- INCUBATOR.
- B- SIDE ARM WATER HEATER.
- C- WATER TANK.
- D- WATER COIL INSIDE INCUBATOR.
- E- GAS BURNER.
- F- GAS COCK.
- G- GAS THERMOSTAT FOR WATER TEMPERATURE.
- H- COLD WATER INLET.
- I- TEMPERATURE AND PRESSURE RELIEF VALVE.
- J- DIP TUBE FOR INTRODUCTION OF COLD WATER TO BOTTOM OF TANK.
- K- THERMOSTAT INSIDE OF INCUBATOR CONTROLLING THE FLOW OF HOT WATER THROUGH COIL.
- L- GAS CONNECTION.

"I'm getting the jump on post-war competition



... by making this simple survey now!"

"I'm not waiting till the war is over to find out who will want new appliances. I'm starting in right now to get the jump on competition—makesure I *get there first*. By making a simple survey of my territory, I'm getting a complete list of the *live* prospects.

"When I make a gas delivery, I inquire in a friendly way about my customer's post-war appliance plans. For an additional prospect list, I get introductions to neigh-

bors of my customers—inquire about their appliance plans, too.

"Then I keep a record of each call on a small index card, like this:

**Name, address, present L-P gas appliances
Other make appliances, post-war requirements**

This way I'm sure to do a real selling job when appliances—like the new and improved L-P Gas Refrigerators—are available again."

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SERVEL, Inc.



PEACETIME MAKER OF THE SERVEL GAS REFRIGERATOR





▲
These brooders are in use at the Weidner Farms near Knight's Landing, Calif., and are the products of the A. R. Wood Manufacturing Co. Using propane, the "mother" 350 young turkeys to a brooder. Total production, 30,000 to 40,000 turkeys per year.

we have an annual potential load of 279,212,500 gallons of liquefied gases for brooding purposes alone, all of which should be ours because of the superior merits of gas brooding which will later be set forth. To this, add 34,604,000 gallons which we can easily sell for incubating purposes, plus 2,000,000 gallons for waxing, plus 500,000 gallons for singeing, plus 4,165,000 gallons for delousing purposes and you have the astounding total of 320,481,500 gallons which the poultry business should be calling upon us to supply annually.

I have used these words "should be calling upon us" advisedly. Of course they should, but you can bet your bottom dollar that they won't as long as we are asleep at the switchboard! We must be as aggressive as our electric competition.

If they can sell mediocre brooders while we possess something better, what can explain it except incompetence? In truth, we must say of ourselves: Nero is fiddling while Rome burns!

Next Month:
Superiority of Gas Brooding.

W. W. Vandever, Dist. No. 2 Director, PAW, Resigns

W. W. Vandever, who has been acting as Director in Charge, District Two, Petroleum Administration for War, resigned Dec. 1 to resume his former activities with the Allied Oil Co. of Cleveland.

It is expected that E. J. Bullock, who has been working directly with Mr. Vandever will be made Director in Charge.

How To Determine Storage to Serve Demand Load At Various Temperatures

Letter of Inquiry

WE operate a liquefied petroleum gas distribution and storage tank service and supply defense industries with butane and propane gas throughout the Puget Sound defense area. We also supply storage containers for these gases as a special service to our customers.

"Each time we are called upon to install a liquefied petroleum gas storage tank, we are confronted with a problem concerning the required storage tank capacity necessary to vaporize given quantities of propane liquefied petroleum gas (C_3H_8) at various degrees of F. temperature. We would, therefore, appreciate your assistance in obtaining information on the following:

"1. What, stated in gallons or pounds per hour, will a 1000-gal. water capacity, 200-lb. working pressure, aboveground storage tank vaporize at temperature ranges of 60°, 40°, 30°, 20°, 10°, 0° F. when filled with propane to the legal maximum allowance of 83%?

"2. To what extent will the ratio of vaporization be affected when the same storage tank is filled with the same fuel to 50% and 25% of maximum water capacity?

"3. What effect, if any, does shape and side-wall thickness of metal have on the rate of vaporization?

"4. Will the rate of vaporization in other size tanks of like shape and metal thickness be in the same pro-

portion as the Q.E.D. of the 1000-gal. capacity tank?

"5. If possible, we would like the same information on straight butane liquefied petroleum gas (C_4H_{10}) at temperature ranges of 60°, 50°, and 40° F.

"Proper solution to this problem will be of great significance to many distributors other than ourselves.

"STEWART MATTHEWS"

Answer

By E. R. Weaver, Chemist, National Bureau of Standards, U. S. Department of Commerce, Washington, D. C.

The problem of how much propane or butane can be evaporated from a storage container without the artificial application of heat is one of heat transfer from the surroundings of the containers to the surface of the liquid where evaporation occurs. Several things are involved in addition to those mentioned by your correspondent, particularly wind, radiation, and the formation of ice.

In the transfer of heat from the atmosphere to the tank, warm air is brought near to the cold metal by air currents, but because of viscous effects, the movement of air very close to the surface is very slow, and it is only at a considerable distance that the movement

of the air is unimpeded by the proximity of the stationary metal. Across the nearly stationary layer of air, and to a decreasing extent across the more distant and more rapidly moving layers, the transfer of heat is by conduction.

Air is so much poorer a conductor of heat than metal that the effect of any reasonable thickness of metal vanishes in the uncertainty about the air currents; we can assume that the metal is at the temperature of the liquid immediately in contact with it. Of course, there is a temperature gradient within the liquid similar to that in the air outside, but with a liquid as mobile as propane or butane the resistance to transfer of

heat through the liquid is only a few percent at most of that through the air and may also be neglected in a calculation involving as many uncertainties as the present one. The rate of exchange depends almost entirely on what happens outside the tank.

Air Currents Affect Temperature

The air currents produced by the difference in temperature between container and surroundings are feeble in comparison with even a slight outdoor breeze, hence, the rate of evaporation in a storage tank in open air will almost always be materially higher than it would be if the tank were in the still air of a cave; how much higher depends on how strong the wind is.

A considerable amount of heat is also transferred by radiation. Ordinarily the net transfer is from surrounding objects to the cold tank, or from the sun, but on a clear night it is quite possible that the radiation from the tank into space will be greater than from the warm ground to the tank.

If fuel is to be used uniformly over 24 hours, it would not be safe to count on radiation to help; if most of the fuel is used only during the daytime, radiation may help materially. Painting at least the upper part of the tank white is an advantage in keeping up pressure at night, as well as in reducing excessive pressure during the day. A thin awning of any material would serve the same purpose; thin sheet aluminum would be ideal.

Full advantage cannot be taken of the low boiling point of propane because, at any time the temper-

INSUFFICIENT VAPORIZATION in cold weather frequently confronts members of the LP-Gas industry, especially when limited customer storage accompanies large appliance demand.

A few months ago, Stewart Matthews, Northern Gas Co., Seattle, sought expert advice upon this subject so that he might better serve his industrial and domestic accounts, many of which were without needed storage capacity because of war limitations upon the manufacture of high pressure steel tanks.

Mr. Matthews submitted his problem to William C. Brown, consultant of the Technical Advisory Service of the Smaller War Plants Corp. in Seattle, who, in turn, petitioned the U. S. National Bureau of Standards and the Phillips Petroleum Co., among others, for specific information covering vaporization at various temperatures of liquefied petroleum gases when stored above-ground in given size tanks.

In the May issue of **BUTANE-PROPANE News** (Page 51) we published the reply of George R. Benz, of the Phillips Petroleum Co., which treated the subject from a practical standpoint. Published herewith is the more technical analysis of vaporization problems submitted by E. R. Weaver, chemist, National Bureau of Standards, U. S. Department of Commerce, Washington, D.C.—Editor.

ture of the tank falls below the frost point, an insulating layer of frost or ice begins to form.

Fig. 1 shows the temperatures at which frost will begin to form under various conditions of temperature and relative humidity of the surrounding air. If conditions for ice formation exist continuously for a long time, ice will accumulate until it provides enough insulation to prevent its outer surface being cooled below (1) the freezing point or (2) the frost point at the prevailing humidity.

Assume, for example, that fuel was being used at a constant rate sufficient to cause a 20° differential of temperature between the inside and outside of the tank and that the atmospheric temperature fell to 48° F. with a relative humidity of 80%, and stayed there. Ice would begin to form over the surface of that part of the container in contact with liquid. A difference of temperature of approximately 20° F. would be required between the surface of this ice and the atmosphere in order to supply the heat of vaporization of the propane; hence, the temperature of the surface of the ice would fall to about 28° F.

The temperature and the corresponding vapor pressure of the propane in the tank would gradually fall as the thickness of the ice increased, always maintaining enough difference of temperature through the ice to provide the necessary flow of heat for evaporation.

This would continue until the propane reached its boiling point at the delivery pressure which, if the

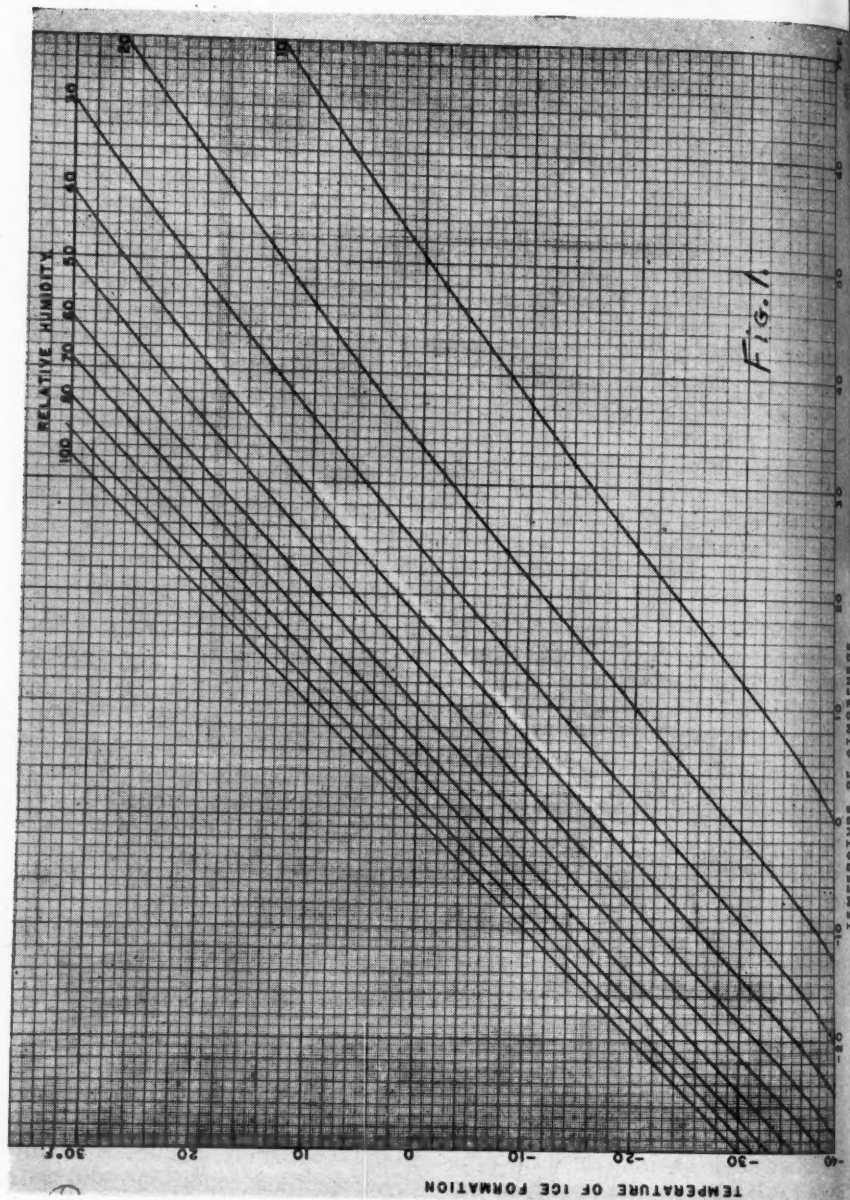
governor were set to deliver gas at only a small pressure, would be only a little above the normal boiling point of -44° F. After that, the temperature of the liquid would remain constant but, heat being unavailable for vaporization at the initial rate, the rate of withdrawal of fuel would fall off.

As the ice continued to increase in thickness, now with a constant temperature on the inside of the layer, the outside would warm up until the melting point was reached, after which water would condense only as liquid and drip off without further increasing the thickness of the film. In the steady state thus produced, the rate of vaporization of propane should be about the same as though the temperature of the container were 32° and no ice were present.

Humidity Increases Heat Transfer

If now the relative humidity of the outer air fell to 60%, ice would evaporate, and as it became thinner, heat transfer would be more rapid, more propane would evaporate and the temperature of the surface of the ice would decrease until a steady state was again reached, either because the vapor pressure of the ice was equal to that of the surrounding air or because heat was being transferred at the rate necessary to meet the demand for fuel. (In the assumed case both conditions would be met at once. See Fig. 2 again.)

It should be clear from this example that the "steady state" which would eventually result from uniform weather conditions and rate of evaporation of propane, will cor-

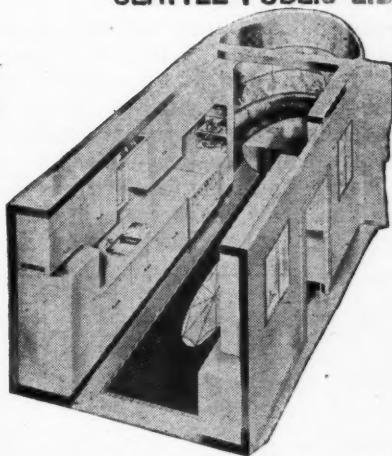


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The gas kitchen will be a powerful factor in selling gas appliances after the war. The New Freedom Gas Kitchen program, sponsored by the A. G. A. will help you to promote L. P. Gas Kitchens. Here are 12 good reasons why your customers will want Magic Chef Gas Ranges and why it will pay you to feature them as the HEART of your gas kitchen program.

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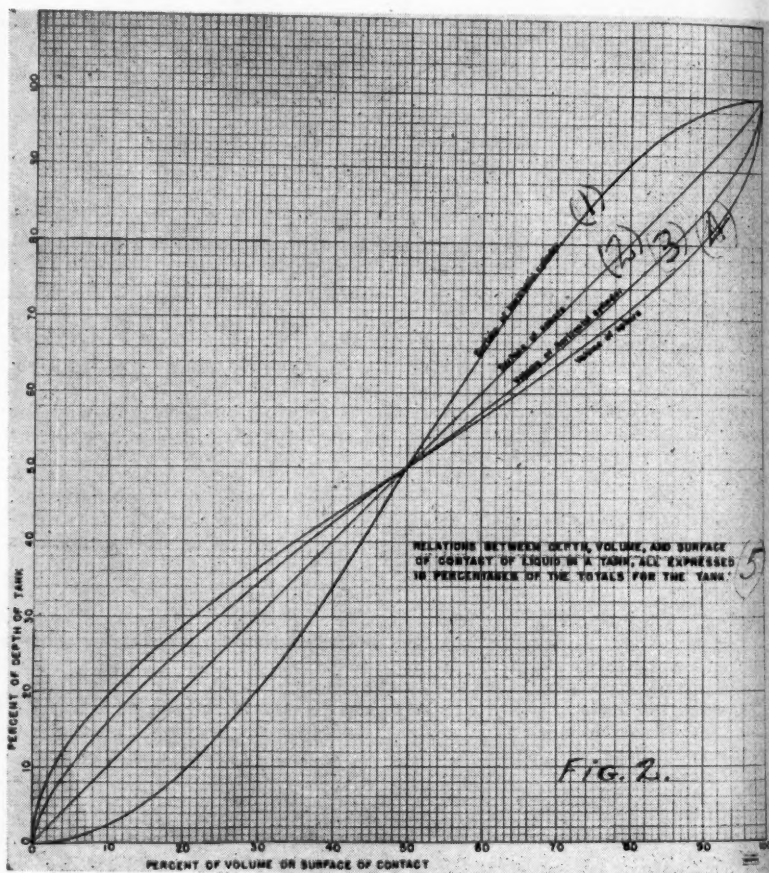


Magic Chef

RED WHEEL GAS RANGES AND HEAVY DUTY GAS COOKING EQUIPMENT

respond to a container temperature equal to the lower of the freezing point or the "dew (frost) point." If the frost forms entirely below the freezing temperature, it may be loose enough to brush off, but if it warms up to the melting point and again cools, hard ice will be formed. Under ordinary weather

conditions, a long time will be required for ice to build up sufficiently to cause such a change of operating conditions as in the example given. If ice does not form on a container in the daytime, it is improbable that it could form at night in sufficient depth to interfere with operations unless weather



(1) Surface of horizontal cylinder. (2) Surface of sphere. (3) Volume of horizontal cylinder. (4) Volume of sphere. (5) Relations between depth, volume, and surface of contact of liquid in a tank, expressed in percentages of tank totals.

conditions are unusually abnormal.

Since the boiling point of butane is approximately 33°F. , just above the freezing point of water, the formation of ice does not affect the utilization of butane.

Breeze Increases Transfer Rate

The uncertainty as to what combination of weather conditions will be encountered is so great that there seems to be little use of attempting to estimate the rate of heat transfer per unit area of tank surface with a high degree of accuracy. In perfectly still air and with balanced radiation, the convection produced by the cold container would probably permit the transfer of only about 0.8 Btu. per hour per square foot of cold surface per $^{\circ}\text{F.}$ difference of temperature between container and atmosphere, but a breeze of only 5 miles per hour would produce an exchange of heat at approximately 10 times that rate, and a breeze of even 1 mile per hour would triple it. Outside a Coleridge poem, there is always a little movement of air. We should probably not assume a transfer of less than 1 Btu. per square foot per hour per degree in even an extreme case.

In a still atmosphere under clouds, a not too light colored container might receive nearly as much heat by radiation as by convection. If it is painted dark green for camouflage, it will exchange roughly 10 times as much heat by radiation as if it is freshly painted white, and from 5 to 8 times as much as if it has a good coat of aluminum. In view of the fact that propane containers are light col-

ored and that at night when the air is coldest, they may be losing as much heat by radiation as they gain, radiation can probably also be neglected in considering the minimum rate of evaporation.

We must next consider the surface available for heat transfer in relation to the size, shape, and contents of the tank. Conduction of heat through the metal from parts of the shell not in contact with the liquid will be disregarded. This will partially offset the assumption that the resistance to flow of heat through metal shell and liquid is negligible.

Tank Shapes Determine Volume

Fig. 2 shows in terms of percentages the depths of liquid in a spherical or a horizontal cylindrical tank and the corresponding volumes of liquid in the tank and areas of surface of contact with the walls of the vessel. The curve for surface of a cylindrical tank is for the cylindrical part only. If it had flat ends, the curve for their surface in contact with the liquid would obviously be the same as the curve for volume of the horizontal cylinder. Curves for the surface of an ellipsoidal head would be something between those for a hemispherical and those for a flat head and can probably be interpolated accurately enough by inspection, as can the volume inclosed by the ellipsoidal portion. The use of the curves can probably be best shown by an illustrative problem.

It will be assumed that a 1000-gallon tank is a cylinder 4 feet in diameter (d) and 8 feet in length (1), inclosed by hemispherical

heads. (The computed volume is about 1003 gallons.) We want to know the area of surface in contact with liquid when the tank is 83% full (i.e., contains 855 gallons). The volume of the cylindrical

$$\text{portion is } \frac{\pi d^2 l}{4} = 100.5 \text{ cu. ft.}$$

The volume of the hemispherical ends, which together constitute a

$$\text{sphere, is } \frac{\pi d^3}{6} = 33.6 \text{ cu. ft., one quarter of the total.}$$

Following the vertical line on the chart representing 83% to its intersection with the line marked "volume of horizontal cylinder," it is found that a horizontal cylinder with plane ends 83% full would be filled to 77% of its depth. The intersection of the same vertical line with the curve marked "volume of sphere" shows that a sphere 83% full would be filled to about 74% of its depth. The depth in the tank combining the two forms will about correspond to an average of these weighted in proportion to the contained volumes, that is, it will be about $3 \times 77 + 74$

$$\frac{\quad}{4} = 76.$$

Following the horizontal line representing a depth of 76% to its intersection with "surface of horizontal cylinder" and "surface of sphere," we find that about 67.5% of the cylindrical surface and 76% of the surface of the sphere are wet. The total surface for heat transfer is, therefore, $0.675 \pi d l + 0.76 \pi d^2 = 106$ square feet, approximately.

The latent heat of propane is 816

Btu. per gallon; that of butane is 841 Btu. per gallon. If we were right in assuming transfer at the rate of 1 Btu. per hour, propane should evaporate at the minimum rate of 106

$$\frac{\quad}{816} = 0.15 \text{ gallon per hour}$$

and butane at the rate of 106

$$\frac{\quad}{841} = 0.13$$

gallon per hour per degree difference between the solid surface (whether metal or ice) and the environment. Unless and until ice interferes, and if the gas is withdrawn under only slight pressure, the temperature of the metal may be assumed to be 2.5° or 3° above the boiling point of the liquid, that is, the temperature of the propane tank can be assumed to be about -41° F. and the butane tank 36° F. Then with an atmospheric temperature of 50°, propane can be evaporated from the tank at the initial rate of about $0.15 \times (50 + 41) = 14.5$ gallons per hour, and butane at the rate of about $0.13 \times (50 - 36) = 1.8$ gallons per hour. But because of the formation of ice the potential rate of vaporization of propane would fall eventually, in even moderately humid weather, to $15 \times (50 - 32) = 2.7$ gallons per hour. These are approximately minimum figures. Sunshine and wind will increase them in all but the dullest weather.

With the information and figures given, there should be no difficulty in determining the effect of shape, size, and contents of cylinders with greater accuracy than it will be possible to estimate the probable conditions of weather.

FISHER'S

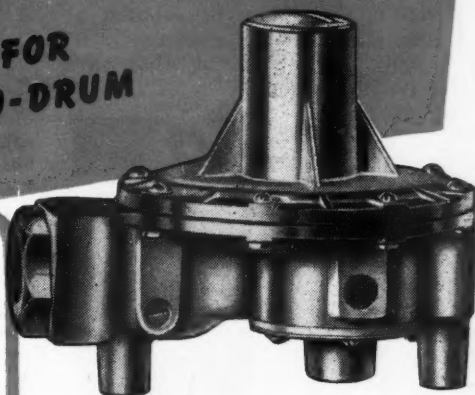
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Series 721 regulators are furnished with various inlet and outlet connections for single drum service or with double acting check valve cross "T" for two drum applications. They are designed to handle a capacity of gas entirely adequate for all domestic and normal commercial loads.

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Capacity—Suitable for loads up to 120 cu. ft. per hour or more.

Setting—11" Water Column at 30 cu. ft. per hour 100 lbs. inlet.

Inlet Connection— $\frac{1}{4}$ " to $\frac{1}{2}$ " pipe size and POL.

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Mounting—Cadmium plated steel foot screws and washers supplied with each regulator. Cadmium plated steel mounting bracket furnished on order at extra cost.

Fisher's series 721 regulators are still available in reasonable quantities. Orders can be accepted under the provisions of General Limitations Order L86 provided they carry priority rating of AA3 or better.



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Larger Customer Storage Would Save Money for Dealers

TODAY, the refiner or supplier of butane complains constantly of the 5 to 1, or 4 to 1 "or what have you" load that he has. He is constantly asking the butane dealer to find a summer load, or put in enough storage to carry him through the winter. I know butane dealers that have run as much as 18 cars of butane a month through an 18,000-gallon storage. Of course, the storage has a lot to do with it, but the underground storage at the consumers' appliance is the bottleneck.



HENRI JENNINGS

There are consumers by the thousands who bought 150-gallon systems, to use in connection with a range, and later put in two floor furnaces, three spare heaters, hot water heater, and gas refrigerator, and have never been told by the salesmen that the system was too small for that load. If they did report the additional load, the salesmen did not take the time to explain why the system is too small.

Customers and government authorities are in the mood to listen to reasoning now; later they may not be. Why not let the customer buy some of the bulk storage that he really should have bought at the time of the original purchase, or when he asked for additional appliances back in 1939 or 1940? Sell him enough tank capacity now to last him from

By HENRI H. JENNINGS

October until March. It can be done, and you have a much better chance, selling that customer who does not have ample tank capacity, than trying to get a new one.

Right all your wrongs on gas delivery while things are slow and sales are easy. Save your truck—save your bulk storage buying and make your customer buy the storage he needs, and you will be surprised at what a small amount of bulk storage you really need. If you are going to purchase a storage, consider all the customers you turned away in the past, because they would not spend enough money to purchase a butane gas system, or you would not put out an investment that large for the gas profits you would receive from a range or refrigerator customer.

Electric Appliances Will Fail

First, consider purchasing a propane storage, so you can put a bottle on that range, or refrigerator. Later you can sell him a hot water heater, and heating appliances; also, the proper size butane system. Those bottles will hold him for you until that electric refrigerator goes bad, or he decides that gas is the finest heat in the world.

That bottle can keep the electric stove, hot water heater or refrigerator out of his house, or wait for the "electric appliance undertaker". Then bounce on him for that replacement.

You can always use that propane bulk plant for butane. You can make that propane bulk plant pay the dif-



You're **on our mind—constantly**

Not on just one desk pad, but on many calendar memos—in all departments of our company, you'll find jottings that are related to you and your company in a very vital way. They represent notes of dead-in-earnest meetings between department heads—, appointments with design and research engineers—, artists and technicians—, trains to catch, and field studies to be made—, Yes, they're all there, and for just one purpose—

We're thinking earnestly, constantly of making **UNIVERSAL GAS RANGES** that will maintain and improve the Gas Industry's position of dominance in the field of cooking.

We're convinced that we have an obligation beyond that of just making a good stove to sell at a profit—we are proud to be a part of a great industry, and we accept the responsibility to act and plan, through war and into peace, in just that way—

*To Keep Universal—America's Preferred Cooking Choice!
To Keep Gas—America's Preferred Cooking Fuel!*



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UNIVERSAL GAS RANGES

ference you will spend for it by using bottles. Think of the range and refrigerator business you have missed by not being able to give your potential customer service until he made up his mind, or the electric dealer made it up for him.

Think what you will save on delivery cost if 75% of your customers could be serviced three times per year.

Think what an aggregate storage capacity you would have.

Think how your gas supplier or his competitor would want your business, if you were on a 2 to 1.

American Liquid Gas Purchases Assets of Wilmington Fuels

The American Liquid Gas Corp., Los Angeles, has purchased the contracts and equipment of Wilmington

Fuels Co., which has been operating for several years as a fuel distributing and sales organization with offices in Santa Ana, Calif. American Liquid Gas will continue to serve all present customers.

Already maintaining a large volume of this type of business, which totaled sales of more than 40,000,000 gals. in the past two years, American Liquid Gas will now be able to augment considerably its activity in the sales and service of liquefied petroleum gas.

Many services are offered by the company, including installation of gas-air plants, filling stations, standby plants, fuel supply and transport. The company also manufactures carburetion equipment and other supplies for the utilization of butane and propane.

Save from 500 to 1000 lbs. of LP Gas Vapor from each Tank Car

Conservation of petroleum products is a war necessity. The vapor left in the tank after liquid petroleum has been transferred from a tank car or truck equals from 500 to 1000 lbs. of LP Gas! This booklet... probably the most comprehensive ever prepared... tells how this vapor can be salvaged with the Brunner LP Gas Unit. This unit for gas transfer and recovery is outstanding in speed, efficiency and low cost. The savings in gas alone will pay for the unit after a few unloadings. In addition, the time required for unloading is greatly reduced. Brunner Manufacturing Company, Utica, N. Y., U. S. A.

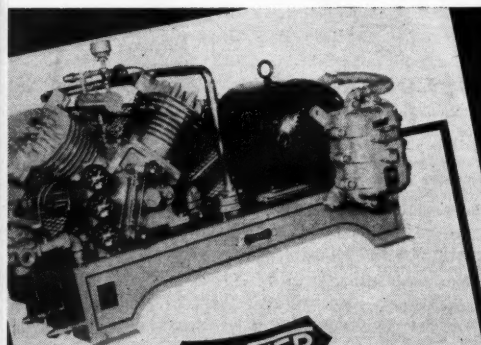
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Send me the booklet describing the Brunner LP Gas Unit and containing diagrams, tables and valuable information on the handling of liquid petroleum gas.

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COMPRESSOR ASSEMBLY THAT WILL PUMP VOLATILE LIQUIDS AND SALVAGE THEIR RESIDUAL VAPORS

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UTICA, NEW YORK, U. S. A.

THIS
NEW
BOOKLET
tells how to
SALVAGE IT!

Critical Materials

(Continued from Page 19)

Butanes is their wartime role in the production of synthetic rubber. In achieving the required production of synthetic rubber, which has been recognized by many as the outstanding chemical achievement of the war, enormous quantities of light hydrocarbon gases are required as raw material. The contribution of LP-Gas products is graphically portrayed in Fig. 3.

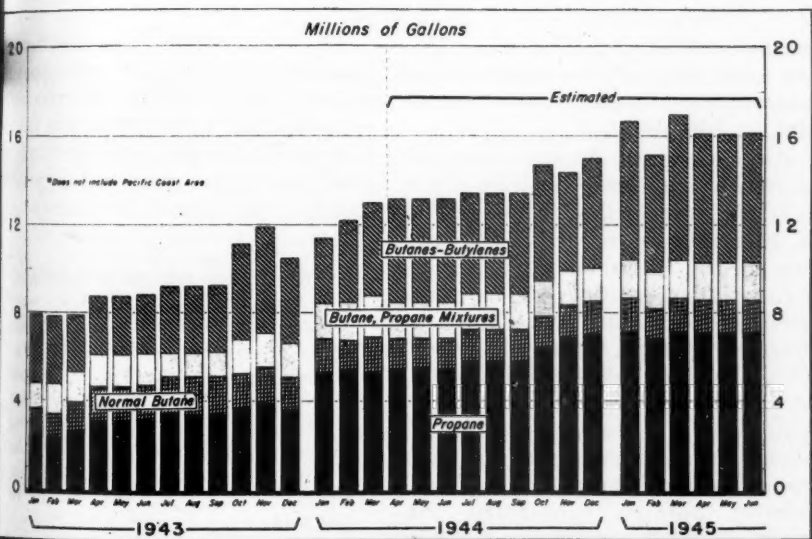
In the production of butadiene, one of the chief ingredients of synthetic rubber, large quantities of butane-butene mixtures are required. Thus, as in the case of isooctane alkylate, the production of

synthetic rubber imposes large demands upon butanes.

The survey reveals that 55,434,000 gals. of LP-Gas were required for synthetic rubber production in 1943 and 205,457,000 estimated in 1944, an increase of 270%.

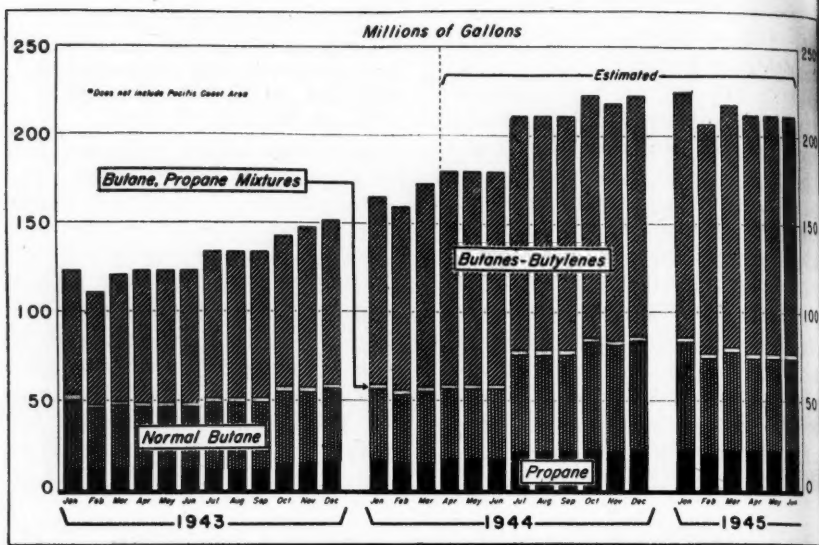
Again, the future demands for LP-Gas products for synthetic rubber components are similar to those previously mentioned in the production of aviation fuel in that no reduction in their use can be expected until total victory in Europe and the Pacific. Even with total victory, the nation's synthetic rubber plants may be expected to continue maximum production to fill backlogs of civilian requirements in addition to replacing large

Fig. 1. Use of Liquefied Petroleum Gases for Chemical Manufacture.*



Source of information for Figs. 1, 2 and 3: Report by Special Liquefied Petroleum Gas Survey, Joint PAW Districts Committee, Natural Gas and Natural Gasoline Division, Petroleum Administration for War, January 1, 1945.

Fig. 2. Refining Uses of Liquefied Petroleum Gases.*



amounts of imported natural rubber until such time as natural rubber sources are once more revived and productive.

As mentioned above, statistical and graphical data will not be given for LP-Gas fuel uses. However, it is interesting to note that the survey clearly indicated a swing of significant magnitude to the predominance of propane over butane-propane mixtures for fuel uses. This abnormal relationship results, of course, from the temporary diversion of large quantities of butanes to war products. The fuel use of normal butane and spent refinery butanes throughout the period studied, continues to bear the same relationship to the use of propane and butane-propane mixtures, as in the past.

The well known fact that ample propane exists at production sources was indicated by the survey. The lack of distribution facilities precludes the classification of this potential supply as available supply for actual consumer demands.

The critical butane and butane-propane situation of the past winter, together with that of the present winter, is definitely confirmed by the survey. It should be noted that the survey indicates a greater shortage of butane and butane-propane mixtures for the winter period of 1944-45 than was experienced during the winter of 1943-44.

The severity of the current shortages, as of December 1944-January 1945, of LP-Gas for fuel is the

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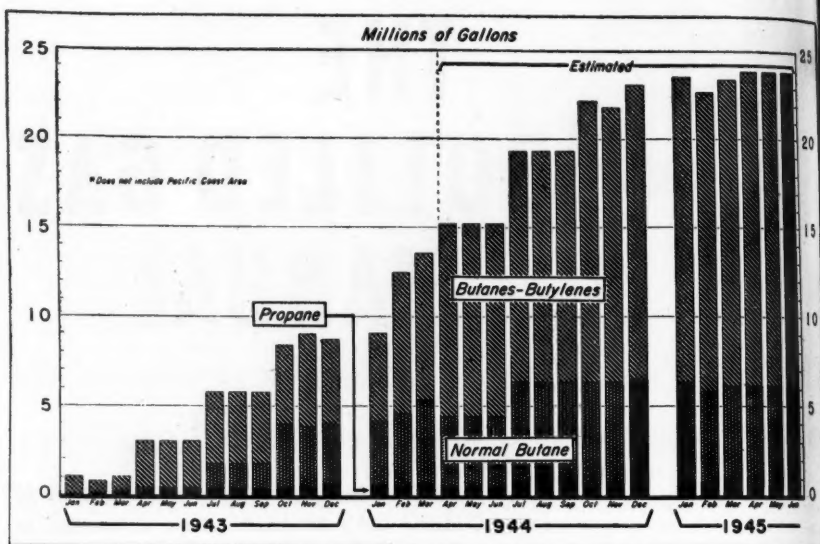
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FEBRUARY — 1945

Fig. 3. Use of Liquefied Petroleum Gases for Synthetic Rubber Components.*



rect result of lack of transportation facilities, mentioned above, and also of the lack of butane, which was clearly predicted by the survey as early as the summer of 1944.

In anticipation of present LP-Gas problems continuing throughout the year of 1945, the Petroleum Administration for War has requested the Special LP-Gas Survey Joint Sub-Committee to continue the study for an additional period of time.

As indicated by the preliminary report of the committee in September and substantiated by their final report, there was a shortage amounting to 4 to 7 million gallons per month of butane for all uses. This shortage was immediately felt

by the LP-Gas industry. With the cooperation of the Refining Division of PAW, the necessary steps to alleviate this condition were taken to divert certain streams of mixed butanes from refinery use to LP-Gas fuel markets.

The present shortage of LP-Gas products, the result of wartime demands, is a widely discussed subject. These discussions are not, in general, restricted to present conditions but in many cases predictions have been voiced that these shortages will continue even after the return to normal times. Some visualize a propane shortage; others predict continued difficulty in obtaining the desired amounts of butane. The discussion herein relating to LP-Gas operations, of

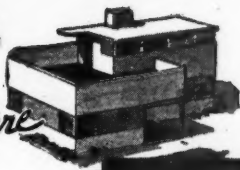
HEAT CONTROL in a package for

Homes of the Future

B-60

PACKAGE SETS

Everything you need—wrapped up in a package—for quiet, safe, automatic control of central and floor furnaces, gas-fired boilers, radiators, gas ranges and water heaters. Handling manufactured, mixed, natural or butane gas, the B-60 gas valve with tamper-proof cover and integral pilot valve assembly; an ivory-and-chrome finished Trim-therm thermostat; 30 feet of wire;



Write for
Catalog 52



and a thermocouple pilot generator providing all current needed for efficient valve operation. Regular, thermometer and timer-thermostats available are with or without night cut-off.

GENERAL CONTROLS

801 ALLEN AVENUE • GLENDALE 1, CALIFORNIA

BRANCHES: Boston, New York, Philadelphia, Cleveland, Detroit, Denver, Chicago, Dallas and San Francisco



BULK PLANTS
100 LB.—W.P.
ANY SIZE

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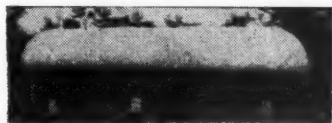
BULK PLANTS
125 LB.—W. P.
ANY SIZE

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BULK PLANTS
200 LB.—W. P.
ANY SIZE

WE HAVE MATERIAL AND FITTINGS TO COMPLETE SEVERAL LARGE STORAGE VESSELS

LET US
ASSIST YOU
IN FILING
WITH W.P.B.
AND P.A.W.
FOR
APPROVAL



DON'T
WAIT UNTIL
YOU MUST
HAVE THE
STORAGE.
APPLY
NOW.

IF YOU ANTICIPATE
PURCHASING A BULK PLANT
ANY TIME BETWEEN NOW AND
THE WINTER OF 1945, CONTACT

DELTA TANK MANUFACTURING CO.
BATON ROUGE, LOUISIANA

the return to normal times, is based upon an analysis of the Survey Committee's report.

The trend observed suggests that with the return to normal times, there will be a marked decrease in the demand for LP-Gas products which are now required for wartime fuels and raw materials. Accompanying that decrease will be an increase in use as conventional LP-Gas fuel, including the possible development and production of new fuels and for chemical manufacture.

There should be ample supplies of propane and butanes to be used as economic conditions dictate, with increased supplies as needed, made possible by the availability of equipment for their production, transportation, storage and utilization. As increased demands for LP-Gas products come about, production should keep pace with or possibly exceed market demands.

Diversified opinions have been voiced regarding the magnitude of demands which may be made of LP-Gas in its capacity as a chemical raw material on the return to normal times. Based upon present operations, which find butane-butene and isobutane as the key components for present chemical manufacture, when synthetic rubber and aviation fuel are included, there is a tendency to predict that butanes will be in such demand that a general shift to the lighter product propane will be necessary for the expansion of the LP-Gas fuel industry.

Rapidly changing conditions suggest that this supposition may not

be entirely correct. In fact, some predict just the opposite; i.e., propane will be the key component for chemical manufacture.

In analyzing this situation,* it must be pointed out that with the return to normal times the large quantities of butanes presently going into war material can be made available for peacetime uses. Too, we are now passing from an era of moderate thermal cracking into one in which intensified catalytic operations will predominate. Thus, where butane has been necessary to produce propylene in moderate thermal cracking, catalytic dehydrogenation will permit the use of propane as charging stock when the perfection of a satisfactory separation process is developed.

In general, the present trend suggests that acetylene, ethylene and propylene will be the major components in tomorrow's chemical synthesis.

The difficulties now being encountered by the LP-Gas industry to meet its responsibilities may even become more acute. Nevertheless, these sacrifices and determined efforts of industry will not go unrewarded because these very experiences are creating an orderly, matured industry, insuring a firm foundation upon which will be built tomorrow's modern LP-Gas industry, an industry fully exploiting its unlimited opportunities and whose stature in a relatively short period of time will compare favorably with that of other large industries.

* It is estimated that in 1944, LP-Gas used as fuel will be less than 20% of the total LP-Gas used for all purposes.

THE TRADE

E. S. Sedlachek, sales manager of Scaife Co., Oakmont, Pa., is now engaged in traveling over the entire country holding sales meetings with his distributor outlets for Scaife liquified petroleum gas cylinders.

During January, Mr. Sedlachek was on the Pacific Coast conferring with the Paramount Manufacturing Co.; Western representatives. He reports that Scaife Co. is still devoting two-thirds of its facilities to war work.

Fisher Governor Co., Marshalltown, Iowa, announces the appointment of Allan K. Cook as its exclusive sales and engineering representative in western Kentucky and southern Indiana. He has established his offices in the McDowell Bldg., 505 So. Third St., Louisville, Ky.

Mr. Cook is a graduate engineer from the Massachusetts Institute of Technology.

Edward B. Mockel has rejoined the sales promotion department of Servel Inc., Evansville, Ind., after a two-year leave of absence.

Before the leave of absence, during which time Mr. Mockel was an expediter for Henry J. Kaiser, Inc., shipbuilders in Providence, R. I., he was sales promotion representative for Servel's New England district.

Miss Celia S. Bush has rejoined The Estate Stove Co., Hamilton, Ohio, as director of home service, it was announced recently by S. C. Bernhardt, vice president in charge of sales.

Miss Bush, who held this position with Estate before the war, has ended a two-year leave of absence and re-

turns to organize an expanded home service department.

In addition to range testing and research, Miss Bush will prepare a home service training course and invite home service directors of Estate distributors to the factory at Hamilton for a week's training with Estate "Heatrola" ranges.



"CY" EDWARDS

"Cy" Edwards, who for the last nine years has supervised advertising of the pump division of the Geo. D. Roper Corp., Rockford, Ill., has been appointed advertising manager of all company activities, effective Jan. 1, according

to an announcement by Roper vice president, E. Carl Sorby.

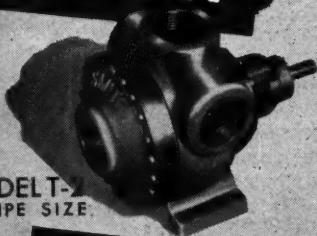
Through his long association with range as well as pump advertising problems, the new Roper advertising manager is well equipped to carry out plans for maintaining a well-rounded program to assist all Roper customers.

Mr. Edwards replaces E. R. Hoilingsworth, who will continue to work actively with the Geo. D. Roper Corp. as a member of a Rockford advertising agency.

Paul B. Sagar has been appointed Eastern field engineer for General Controls Co., Glendale, Calif.

Working out of the Cleveland Factory Branch, 3224 Euclid Ave., Mr.

SMITH



MODEL T-2
2" PIPE SIZE

BUTANE-PROPANE PUMPS Capacity 50 GPM

MODEL T-2 is designed for average Tank Truck service. Has capacity of 50 gpm when connected to truck transmission power take-off shaft at 500 rpm.

SPECIAL FEATURES

- **EASE OF INSTALLATION** . . . Four outlet ports. Simplifies piping.
- **NO HAZARDOUS LEAKS** . . . Simplified fluid sealed packing box assures perfect seal.
- **MINIMUM WEAR** . . . Balanced gear construction permits efficient operation without lubrication.
- **HIGH PRESSURE CAPACITY** . . . Rugged construction, 250 lbs. working pressure. Ample pressure for fast transfer and bottling service.
- **SMALL SIZE** . . . **LIGHT WEIGHT.** Length 16-in., width 10-in., wt. 90 lbs. Larger and smaller capacity models for Tank Truck mounting or direct-connected electric drive.

WRITE FOR FULL INFORMATION

SMITH

Precision Products COMPANY

1135 Mission Street
South Pasadena, Calif.

Sagar will devote the major part of his time collaborating with Eastern appliance manufacturers in working out problems of application and assisting them in test procedures at the American Gas Association Laboratory.

Superior Valve & Fittings Co., Pittsburgh manufacturer of LP-Gas cylinder valves, line valves and SAE

flare fittings, is opening, on Feb. 15, an office and warehouse at 665 W. Washington Blvd., Chicago 6, Ill., to serve their customers in Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, Colorado, Indiana, western tip of Kentucky and the



I. A. WILSON

western half of Michigan, according to K. M. Newcum, vice president in charge of sales.

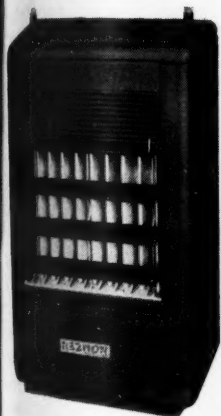
Irving A. Wilson, present Superior midwestern representative, has been appointed manager of this operation and will continue to maintain field contacts.

Thomas E. Cunningham, who has been transferred from the factory, will be assistant manager and have charge of the office and warehouse.

This office and warehouse will be a stocking and shipping point for standard cataloged items.

Naco Manufacturing Co., a California corporation, has purchased the Huntington Park plant of Pacific-Airmax Corp., formerly Pacific Gas Radiator Co., at the same time buying the Root Manufacturing Co., of Cleveland, entire operations of which will be moved to Huntington Park, accord-

we never knew we had so many friends



Orders for Reznor Heaters keep rolling in from all parts of the country.

Deliveries still haunt us because of delayed shipments of motors and other materials, man power limitations, and priorities.

But we appreciate your interest in Reznor products and we only hope we can serve you to your satisfaction.

In many cases, it is impossible to give delivery date upon receipt of order. However, the information is furnished just as quickly as it is possible for us to schedule a reliable delivery date. Nevertheless, most of our orders are being shipped "as promised."

Your co-operation and continued interest in Reznor Heaters will be appreciated.

REZNOR MANUFACTURING CO. **REZNOR** 304 JAMES STREET, MERCER, PA.

"GAS HEATERS EXCLUSIVELY SINCE 1888"



PROPANE-TRANSPORT

**FOR SERVICE
FOR ECONOMY
FOR APPEARANCE**

A complete 1200 net gal. unit built for "Souza's Butane Sales & Service" including spheres, piping, pumps, skirting, painting, etc.

Information on your particular needs, for transportation or storage, can be obtained by writing or calling

Superior Tank & Construction Co.

6155 SOUTH EASTERN AVENUE, LOS ANGELES, CALIFORNIA
PHONE Angelus 4157



USE SINCLAIR BUTANE-PROPANE

Playing a vitally-important role in the war effort are LP-Gases. "Spot Service" keeps mechanized equipment advancing on global battle-fronts. When equipment breaks, a mobile repair unit, LP-Gas equipped, races to the scene . . . ready for welding, metal cutting or anything a white-hot flame can remedy.

At home, in spite of wartime limitations, the methods of using this versatile fuel are constantly increasing. LP-Gases are so easily transported, so controllable, so convenient to use for so many widely varied purposes.

When peace comes, Sinclair LP-Gases, in adequate quantity, will continue to serve you with the same adaptability, portability, and safety; the same efficiency, speed and economy which is now supplying lifeblood to the veins of modern mobile warfare.

SINCLAIR PRAIRIE OIL COMPANY

Liquefied Petroleum Gas Division
Sinclair Bldg. Tulsa, Oklahoma

ing to James L. Hess, sales manager of the Pacific heater division.

Increased facilities of the Huntington Park plant, newly rehabilitated, retooled and aligned for high speed, will permit production of agricultural implements and gas heating appliances.



G. H. SCHLATTER

S. E. Little, vice president in charge of sales, American Stove Co., Cleveland, Ohio, has announced the organization of a sales and service training department to be headed by George H. Schlatter as director of training.

To assist its "Magic Chef" customers in the huge training task ahead, Mr. Schlatter's new department is now developing a complete training course for retail salesmen, as well as a complete training course for gas company and dealer servicemen.

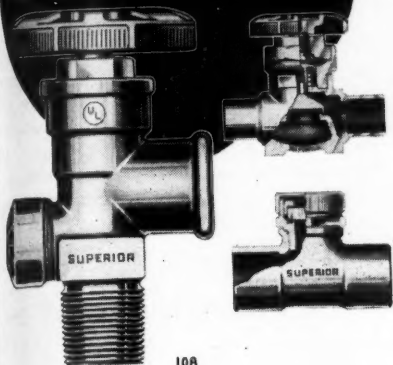
A recent appointment made by American Stove Co. is that of Tracy B. Madole, well known to gas company and kitchen equipment men throughout the Middle West. He becomes manager of Northern sales division of American Stove Company, Chicago.

An announcement has been issued from the firm of J. C. Pitman & Sons, Inc., of Lynn, Mass., that its founder, John C. Pitman, has once again resumed the presidency of the corporation, with the resignation of his eldest son, James F. Pitman.

In November of this year, the latter

Superior LP-GAS VALVES AND ACCESSORIES

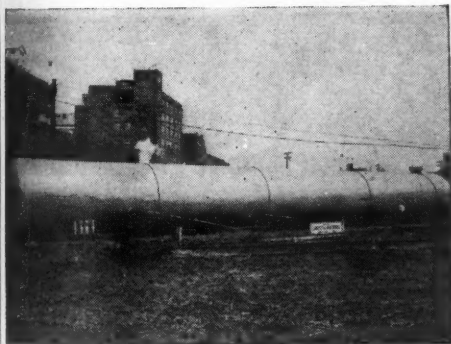
For Bulk Stations, Tank Trucks, and
above and below ground systems.



108

- ★ **LP-GAS CYLINDER VALVES** are listed as Standard and for re-examination service by Underwriters' Laboratories, Inc.
- ★ **GLOBE, LINE AND ANGLE VALVES** — Diaphragm Packless and Wing Cap — in Flare sizes from $\frac{1}{4}$ " to $\frac{3}{8}$ " O.D.; Sweat sizes from $\frac{1}{4}$ " to $2\frac{1}{8}$ " O.D.; F.P.T. sizes from $\frac{1}{2}$ " to 2".
- ★ **SIGHT GLASSES**, suitable for any normal LP-Gas pressure. Entire top assembly removable while soldering lines to body.
- ★ **FLARE FITTINGS**, including Unions, Couplings, Adapters, Elbows, Tees and Nuts — listed as Standard by Underwriters' Laboratories, Inc.

SUPERIOR
VALVE & FITTINGS COMPANY
PITTSBURGH 26, PENNSYLVANIA



30,000 Gallon Water—25,000 Gallon Liquid Propane Capacity Storage Tank 8'4-13/16" O.D. x 76'9-5/16" Long

Complete bulk plants designed, fabricated and installed by experienced men. Detailed information and estimates furnished without obligation.

GAS PLANTS FOR MUNICIPALITIES

LEADERSHIP!

Quality - Safety
Economy

Butane-Propane tanks fabricated in strict accordance with the ASME code; API-ASME Code; Dept. of Public Safety, Commonwealth of Massachusetts; and National Board of Boiler & Pressure Vessel Inspectors' regulations.

Bulk Tanks - Skid Tanks
Truck Tanks

for

Butane • Propane
Butane-Propane Mixtures

**LANCASTER IRON
WORKS, INC.**

LANCASTER

PENNA.

Features That Make
VIKING
THE LARGEST SELLING ROTARY
PUMP IN THE WORLD



AS ILLUSTRATED above, Viking Rotary pumps operate

on the famous "gear-within-a-gear" principle, which provides a larger sealing surface that reduces slippage so prevalent in some rotary pumps after being in service for a time.



Vikings have only **TWO MOVING**

PARTS, each of which is self-supporting. Simplicity means long life and dependable service . . . no frequent replacing of small, intricate parts to maintain pump efficiency.

Write today for Bulletin 2300, which gives complete information about Viking Rotary Pumps widely used in the butane-propane industry. It will be sent free by return mail.

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

retired as an active member of the firm and sold his stock to his father.

It was then announced that Arthur R. Pitman had been promoted from field manager to vice president and general sales manager, to be assisted by William J. Marshall, who was promoted from assistant sales manager to sales manager.

Since 1918, when the first deep fat fryer was invented by Mr. Pitman, he has been endeavoring to educate sea food restaurants to take the old flat bottom iron kettles off the stoves and start a special fry station. In this he was eminently successful, resulting in his company concentrating upon the manufacture of "Pitco Fryalators."



B. H. GIARETTA

John C. Pan-kow, Detroit-Michigan Stove Co. director of sales, has announced the appointment of B. H. Giaretta as sales manager of that company's Northern division. This division includes the Chicago metropolitan area, the state of Wisconsin, and the upper peninsula of Michigan.

The men and women of the A. J. Lindemann & Hoverson Co., of Milwaukee, were awarded the Army-Navy "E" for excellence in production on Dec. 13.

In peacetime, Lindemann & Hoverson are manufacturers of gas ranges and other appliances. Now, however, the company's facilities are devoted to the production of many vital war materials.

*A Name
That Stands
for Quality*

McNAMAR

Tanks for
most all L.P.G.
requirements

McNAMAR
Boiler and Tank Co.

Tulsa, Okla.

Salem, Ill.

BRODIE METERS

SAVE

- * ERRORS
- * LOSSES
- * DELAYS
- * EQUIPMENT



RALPH N. BRODIE CO., INC.

953 - 61st Street, Oakland (8) California • Cable Address
"BRODIECO" • Division Offices. Chrysler Bldg., New York City
59 E Van Buren, Chicago • 302 South Pearl St., Dallas, Texas

Representatives and Stocks in All Principal Cities

Bu-Pro-Fire

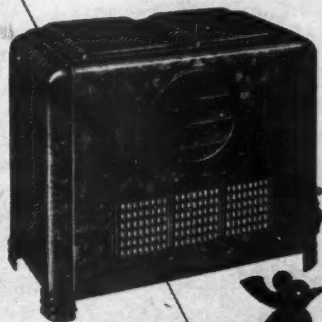
Gas Heaters

A GOOD NAME TO REMEM-

BER FOR GREATER HEATING

EFFICIENCY WITH LIQUE-

FIED PETROLEUM GASES.



DESIGNED ESPECIALLY
FOR L. P. GASES

TENNESSEE ENAMEL MFG. CO.
NASHVILLE 9, TENNESSEE

LP-Gas Is on Critical List In New Draft Plan

The production of liquefied petroleum gases and the installation and servicing of liquefied petroleum gas facilities are declared to be essential industries by the War Manpower Commission in a directive issued Jan. 15. In fact, the production of these gases is included in the critical list.

This means that those men between 26 and 29, concerned with the above occupations, will probably not be inducted under the new draft regulations. The essential lists are furnished the Selective Service boards as guides.

"Must Produce More Trucks," Says War Production Board

The Automotive Division of the War Production Board has called for increased production for the current year.

The 1945 program for commercial and military trucks calls for production of 869,212 units against the 1944 output of from 760,000 to 765,000.

In order to replace wornout equipment and maintain vital transportation, the 1945 program calls for close to 10,000 commercial busses, almost double the 1944 production of 5087.

Fast Unloading Will Aid Critical Transport Situation

The nation is probably going into its most critical year from a transportation standpoint, both as regards rail and truck transportation, according to H. Emerson Thomas, chairman of LPGA transportation committee.

On tank car movements, the railroads are handling the largest tonnage they have ever been called upon to move, and this is causing a slower turn-around time on tank cars, which

in effect, reduces the size fleet available for moving our product.

It thus behooves everyone to unload every car immediately upon its receipt and get it back to the railroad without delay, regardless of holidays, Sundays, etc. It also makes it important for every company to schedule its cars properly, so that they will not come in before they can be unloaded.

The need for pressure tank cars to move aviation gasoline feed stock and synthetic rubber feed stock has increased materially, and as a result the pressure is on us from the standpoint of there not being enough of the high pressure cars available for all movements. The program of fabricating new cars is under way, but the cars will not be delivered until approximately February 1. If it had not been for this new program on the 400 ICC 105A 300W cars, which was pushed by the Association Committee, we would now have a very serious out-of-gas situation. The present shortage involves the propane type car, as there is an ample quantity of the converted cars for the butane use.

In regard to truck transportation, the Petroleum Transport Division of ODT has advised that it looks as though the available trucks for civilian use will be cut about 40% under the anticipated releases for this use.

They also recognize that trucks are getting to the wornout stage very rapidly and are fearful of the results during the coming year. They point out that maintenance of trucks is very important and that operators in our industry should keep in close touch with the local Office of Defense Transportation Maintenance Officer, who will assist in obtaining repair parts.

ODT also stresses the shortage on truck tires and emphasizes the need of care in the use of them and frequent inspection.

HR-119 HARMAN TRUCK-TYPE PUMP

Advance-Flange Pumps with Integral
Custome Bearing for Truck Power
for Oil Installations. Ca-
pacity from 10 to 100 GPM.



**EFFICIENT . . . QUIET
COMPACT**

POSITIVE DISPLACEMENT . . . REVERSIBLE ROTATION . . . LOW
FRICTION BEARINGS . . . NO CONTACTING METAL PARTS

The Harman principle of pump design embodies a single rotor on a shaft rotating off-center in the cylinder. Since 1931, Harman Rotary Pumps have been giving dependable year-in and year-out operating efficiency in the handling of liquefied petroleum gases.

Write Today for Complete Information and Prices!

HARMAN EQUIPMENT COMPANY

Distributors

17 Santa Fe Avenue, Los Angeles 21 • 7 Front Street, San Francisco 11

PETROLEUM PRODUCTS HANDLING AND DISPENSING EQUIPMENT

OPEN THE DOOR

OPPORTUNITY KNOCKS!

Use Southern's Complete
Engineering Service
to

Prepare for Tomorrow's
Postwar Programs in
LP-Gas Dealerships

- PROPANE BULK PLANTS
- TRUCK TANKS—VESSELS
- LP-GAS TRANSPORTS

PLANT:

SAPULPA



SOUTHERN

**GAS AND
EQUIPMENT CO.**

Atco Bldg., Tulsa, Okla.

Wait!

for LP-Gas Carburetion by DIX

In the expansion period after the war, when the automotive industry will be looking for something "new" in butane-propane power, your best bet will be DIX LP-Gas Carburetion Unit. It will pay to WAIT for something NEW.

DIX MANUFACTURING CO.

3447 E. Pico Blvd. Los Angeles 23, Calif.

"KEEP 'EM FRYING"

Use PITCO

Frialators

REG. U.S. PAT. OFFICE

SAVE FAT . . . GAS . . . SPACE

Deep-Fat Frying at Its Best

- ★ Customers can serve a wider variety of fried foods.
- ★ Left-overs or by-products quickly converted into daily specials.
- ★ Increase in customer business means increase in the gas load.
- ★ Actual saving in fat alone more than pays total cost of gas required to operate them.

J. C. PITMAN & SONS,

INCORPORATED

711-719 Broad St. West Lynn, Mass.

Manpower Shortage Brings Drastic Ruling by WMC

The following priorities regulation was issued recently by the War Production Board, following the statement on manpower ceilings issued at the White House by Director of War Mobilization and Reconversion James Byrnes:

Priorities and allocations may be withdrawn or modified if WMC regulations are not complied with. Any priorities or allocations granted by or under the authority of the WPB may be withdrawn or modified at any time when the WPB makes a finding that materials or facilities are not being used most effectively for the prosecution of the war as a result of a failure to comply with an employment ceiling or hiring regulation of the War Manpower Commission.

This regulation applies to all kinds of priorities and allocations which are granted either before or after this regulation is issued, including preference ratings, allotment numbers or symbols, and directions, authorizations, or grants of appeals to deliver or receive material or to manufacture products or to use facilities.

Convention Ruling Concerns Industry Meetings in 1945

Organizations planning to hold conventions, conferences, trade shows or group meetings after Feb. 1 "will have to show how the war effort would suffer if the meetings were not held," Col. J. Monroe Johnson, chairman of the War Committee on Conventions, announced in mid-January.

Members of the committee include Robert P. Patterson, Under Secretary of War; Ralph A. Bard, Under-Secretary of the Navy; J. A. Krug, Chairman of the War Production Board;

and Charles M. Hay, Deputy Chairman of the War Manpower Commission.

Industrial, business, labor, fraternal, professional, religious, civic, social and governmental organizations are included among those requiring permits.

H. H. Morse Elected President Institute of Cooking, Heating

Henry H. Morse, vice president of Florence Stove Co., Gardner, Mass., was elected president of The Institute of Cooking and Heating Appliance Manufacturers in December.

The meeting, held in Cincinnati, was the twelfth annual convention and was marked by important discussions of ways to aid the war effort and still prepare for peace-time production.

American Meter Honors 25-Year Employees

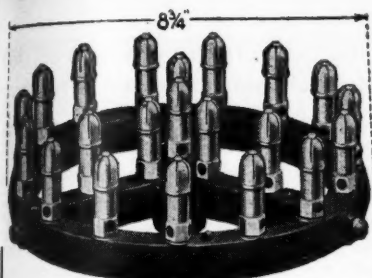
Presentation of certificates and emblems was made recently to 56 workers of the D. McDonald & Co. Works of American Meter Co. who have been with the company's Albany, N.Y., plant for 25 years or more.

Norton McKean, president and general manager of American Meter Co., announced the organization of a "Twenty-Five Year Service Guild," formed to honor those employees.

Price Regulation 88 Amended In Order Issued Jan. 18

Amendment 24 to Price Regulation 88, issued Jan. 18, makes the following change: Sales of liquefied petroleum gas to consumers in single lot deliveries of 500 gals. or less are exempted from coverage by the regulation.

Amendment 8 to Price Regulation



No. C 210 Barber Burner

BARBER Appliance Burners

We make many types of Burner Units to fit a wide range of gas appliances. Nearly 200 appliance makers use Barber Burners. All Barber units correctly designed and equipped with proper jets to suit the appliance. Barber is the ONE burner which assures complete combustion on Butane-Propane or ANY OTHER gas. Appliance builders and fuel distributors give their customers better service, more economy, by advising the use of Barber-equipped appliances. Submit your burner problems to us. Complete Catalog on request.

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland 14, Ohio

Distributors for

REGO
LP GAS EQUIPMENT

Hackney
BUTANE-PROPANE CYLINDERS

L.C. RONEY INC.

GAS EQUIPMENT CO., INC.
2620 South Ervay Street, Dallas, Texas
GAS EQUIPMENT SUPPLY CO.

★ ★ ★ ★ ★ UNITED STATES Automatic Water Heaters Are Made to Last!

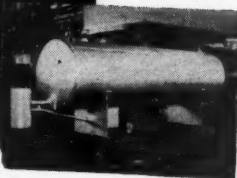
DEPENDABLE
ECONOMICAL
A.G.A. APPROVED

Order the "QUALITY LINE"
and SAVE!



UNITED STATES
HEATER CO.
COMPTON, CALIFORNIA

IT'S
SERVICE
THAT
PAYS
OFF



American Butane
Tanks Are Made to
API and ASME
Codes

It is American's policy to manufacture a product that will give lasting service—service that can be depended upon year after year. In keeping with this policy, American High Pressure Tanks are made of the finest material that can be obtained by craftsmen of many years experience. Specify American when you buy—for quality service.

A M E R I C A N
PIPE & STEEL CORPORATION
Manufacturers and Distributors
Alhambra California

137 ceils sales of liquefied petroleum gas to consumers in single lot deliveries of 500 gals., or less, at the highest price charged a buyer of the same class in the same area for the same grade of gas in March, 1942. Where the seller was not in business in March, 1942, he must file a tentative ceiling with OPA for approval.

Utilities Company Purchases Two Butane-Air Town Plants

Purchase of the butane air-gas systems of distribution at Yreka and Dunsmuir, Calif., has been announced by Martin E. Sands of Medford, Ore., vice president and general manager for the Oregon and Shasta divisions of the California Pacific Utilities Co. Consideration involved was not revealed.

No change in personnel or operating policy of the utilities, formerly owned by the Coast Counties Gas and Electric Co., with headquarters in Santa Cruz, Calif., is contemplated, according to Mr. Sands.

The California Pacific Utilities Co., in addition to the newly acquired properties, operate in Klamath Falls, Ashland, Medford, Grants Pass and Roseburg, Ore. Company headquarters are in San Francisco.

Wm. Pfaff Is Production Mgr. For Round Oak Co.

William Pfaff, production executive of many years' experience in the kitchen appliance field, has been named works manager of the Round Oak Co., Dowagiac, Mich. He is perhaps best known for his development of porcelain parts for appliances and his contributions to the development of steel kitchen cabinets.

At Round Oak, Mr. Pfaff will be in charge of all production and engineering activities of the company.

Oregon Butane-Burning Vehicles Must Display Special Emblem

Operators of motor vehicles in Oregon using fuels other than gasoline are required to have 1945 vehicle emblems on their cars after Jan. 1, Secretary of State Robert S. Farrell Jr. has announced. Emblems may be obtained from the state department here.

Vehicles using butane and diesel and other fuels must have special licenses to purchase them, and each vehicle using these fuels must display the emblem issued for the current year.

Lieut. P. P. Bishop Wins Distinguished Flying Cross

First Lt. Peter P. Bishop, Jr., a former Madison, Wis., district employee of the Philgas division of Phillips Petroleum Co., was recently awarded the DFC for extraordinary achievement in aerial combat. "Pete" was a navigator on a B-24 Liberator bomber during 30 bombing missions over Germany and enemy occupied Europe. His citation read, "for exceptional skill, coolness and courage in aerial combat."

Lieutenant Bishop also wears the Air Medal with three Oak Leaf Clusters.

A former University of Wisconsin student, Lieutenant Bishop entered the Army Aug. 13, 1942, and has been overseas since Feb. 12, 1944.

R. W. Hopkins Buys Out Partner In California Dealership

The assets of the Rural Butane Gas Service in Fresno, Calif., have been purchased by Robt. W. Hopkins from his partner, Cecil E. Bates.

The company will continue business at its established location, 1356 San Pablo Ave.

KEEP TUNED TO BRILLIANT FIRE LP-GAS HEATERS IN 1945

Write for Latest Bulletin

THE OHIO FOUNDRY & MFG. CO.
STEUBENVILLE, OHIO

"Quality Heating Equipment Since 1846"



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ETHYL MERCAPTAN

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standard
odorant
for liquefied
petroleum
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CHEMICAL WORKS**

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... but we're still thinking about our old customers and planning on new ones. When the right time comes, we will again be making butane and propane tanks to your specifications.



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L.C. RONEY, INC.

meets the demands of the nation. Our plant has gone to war for the duration—but when peace comes, L. C. RONEY products for the LP-Gas industry will meet the demands of dealers everywhere. In the meantime—our stock of LP-Gas equipment is still complete.

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1140 44th St. - LOS ANGELES, CALIF.

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EQUIPMENT WANTED

WANTED: ICC-116, or 7-70, and 4B-240 cylinders, used cylinder valves, bulk propane tanks. Box 495, Syracuse, New York.

WANT TO BUY 10 GAS TANKS, 8000 TO 20,000 GAL. CAP. THE DARIEN CORPORATION, DARIEN, CONN.

EQUIPMENT FOR SALE

FOR SALE: ONE USED ROADMASTER vaporizer and carburetor, \$50.00. E. K. BEANLAND, Marfa, Texas.

FOR SALE: 3 H.P.-220 VOLT SINGLE phase vapor proof motor and suction pot and educator tank for butane pumping station. Write SOUTHWEST GAS CORPORATION, Barstow, California.

BUSINESS OPPORTUNITY—OFFERED

BUTANE-PROPANE GAS BUSINESS FOR sale. Have good territory and good equipment. Inquire Box 400, BUTANE-PROPANE NEWS, 1709 W. 8th St., Los Angeles 14, California.

FREE TO WAR VETERANS

If you are a veteran of World War No. 2, you may run a "Situation Wanted" classified ad in this column three consecutive months without charge.

Send in your copy!

Rheem Co. Makes Changes In Eastern Personnel

C. V. Coons, sales manager of the Eastern container division of Rheem Manufacturing Co., has been promoted to assistant director of sales of both the appliance and the container divisions of the company, effective immediately.

George W. Knight, assistant to Mr. Coons, succeeds to the latter's post as manager of the Eastern container division, and E. W. Manstrom, recently discharged from the Army, has been named assistant to Mr. Knight.

The company has discontinued its appliance advisory committee which has been incorporated into its research and development department.

Cooking, Heating Institute Elects A. P. Chester Vice-Pres.

Alden P. Chester, president of the Globe American Corp., of Kokomo, Ind., was elected vice president and a member of the board of trustees of the Institute of Cooking and Heating Appliance Manufacturers at its Twelfth Annual Meeting in Cincinnati recently. Mr. Chester previously served as president of the Institute for three terms: 1938-1940.

Mr. Chester is also chairman of the gas range manufacturers' division.

W. S. Guitteau Joins American Meter Co.

William S. Guitteau has resigned as vice president of Eastern District Operations of the Stacey Brothers Gas Construction Co., of Cincinnati, effective Jan. 1, in order to become associated as a special representative with the engineering sales and service organization of American Meter Co. His headquarters will be at Fort Lauderdale, Fla.

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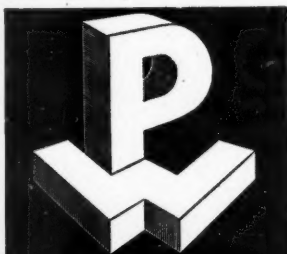
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